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THE GAS JOURNAL

NOVEMBER 19, 1930

We ask our readers kindly to note that our Telephone Numbers (2 lines) are now:
Central **2236-7**

A Glance at the Contents—

Sulphuric Acid Wash Test for Motor Benzole.

Our Continental Notes to-day contain details of a test for motor benzole embodying evaporation carried out in presence of air with a view to simulating service conditions. Such a test gives an indication of the tendency of the fuel to give rise to gum formation.

Centralization of Supply at Barrow.

At the meeting of the Barrow Town Council on Monday, Nov. 10, Alderman Robert Tyson Dockeray, J.P., was elected the new Mayor, and in returning thanks, he gave an outline of municipal activities, and referred to the centralization of the Corporation's gas undertaking.

"Unit" Principle of Works Layout.

An illustrated description is given of the reconstructed works of the Coatbridge Gas Company. The works are arranged so as to allow for the extension of plant necessary to increase the capacity to 4 million c.ft. a day. The present capacity is 1½ million c.ft. a day.

Centenary Celebrations at Hawick.

The Hawick Gas Company, Ltd., have celebrated their centenary, and the occasion was marked by the inauguration of a new holder erected by Messrs. Robert Dempster & Sons, Ltd., of Elland. An exhibition of gas cooking, heating, and lighting appliances was also staged; and this proved highly successful.

Glover-West Verticals at Bideford.

On Thursday last new Glover-West vertical retorts and plant were inaugurated at the Works of the Bideford Gas and Coke Company, Ltd. The retort bench is designed for an output of 620,000 c.ft. of gas a day, at a calorific value of 480 B.Th.U., and a yield of 83 therms per ton; and these figures have proved to be well within the capacity of the plant.

The "Progas" System.

This system is described in to-day's issue by "Gas Engineer," who believes it to be an advance in gas distribution practice. In these days of keen competition, says the author, both gas production and distribution are claiming equal attention by gas undertakings, which are anxious to reduce operating and capital costs of both, and thus the price of gas.

Long-Distance Gas Supply.

The conditions prevailing in the German coal and coke industries were exhaustively discussed at the third technical conference of the Rhenish Westphalian Association for Safeguarding Coalmining Interests, held at Essen, a short note concerning which appears in our news columns, in which the recommendations of Dr. Pott, Director-General of the Stinnes Group, are set out.

New "W.-D." Installation at Shipley.

On Wednesday last a Woodall-Duckham installation of continuous vertical retorts was officially opened at the Shipley Gas-Works. The installation consists of one bench containing 12 retorts heated by means of two producers placed at the ground-floor level at one end of the bench. Each retort is about 25 ft. high and of rectangular tapered shape, being 62 in. by 10 in. at the top. The design of the setting is in accordance with the latest practice of the Woodall-Duckham system.

Inauguration of Waterless Holder.

On Wednesday last a new waterless gasholder, of a capacity of 250,000 c.ft., was inaugurated at the Ludworth Works of the Marple Urban District Council. One of the interesting features of the ceremony was that a lady councillor not only ascended the holder and inspected the work, together with other members of the Council, but also entered the gasholder and inspected the piston and sealing arrangements. The holder was erected by Messrs. R. & J. Dempster, Ltd., of Manchester.

Mr. H. D. Madden on "Gas Fuel in Industry."

Mr. H. D. Madden, M.Inst.C.E., Engineer and Manager of the Cardiff Gas Light and Coke Company, and a Past-President of the Institution of Gas Engineers, contributed a most valuable and comprehensive section on the utilization of gas fuel in industry, supported by propaganda matter of the British Commercial Gas Association and the Cardiff Gas Light and Coke Company, in an "Engineering Supplement" published by the "Western Mail and South Wales News" in connection with the Ninth Annual Exhibition of mining machinery, plant, and appliances, and general engineering organized by the South Wales Institute of Engineers, at the Drill Hall, Dumfries Place, Cardiff.

EDITORIAL NOTES

The Institution Research Meeting.

THOUGH we have every hope that the Special Number of the "JOURNAL" to be published on Dec. 3, which will contain our report of the proceedings at the Autumnal Research Meeting of the Institution of Gas Engineers, may prove a mirror that will draw the eyes of the whole gas industry, it must be admitted that, when all possible has been done, it will remain largely with the members themselves to make it so. A number of reports are to be submitted, and from past experience we know that they will contain information with regard to much valuable work; but that is only part of the opportunity which such a meeting affords.

A very large proportion of the time available in the two days' sessions has been reserved for discussion, and adequate discussion calls for a good attendance. This is all that is now required to make the meeting a complete success, and the Institution Number of the "JOURNAL" a mirror into which every member of the gas industry may gaze long and attentively. We trust, therefore, that for themselves, for their colleagues, and for those who have been responsible for the preparation of the various reports, all members who can in any way do so will make a point of being present at the meeting. In the matter of discussion at technical gatherings, time is usually the dominating factor. On this occasion, as we have said, time is on the side of the speakers—and so "it is up to them."

There will be plenty of current problems to discuss. The back-run process for the manufacture of carburetted water gas, and the disposal of liquor effluents from gas-works are definitely topics of the moment. And the third report of the Ammonia Committee, embodying the Feld processes for the extraction of ammonia and sulphuretted hydrogen from coal gas, by Dr. A. Parker; the use of calcium sulphate in the production of ammonium sulphate, by Mr P. Parrish; and bye-product ammonia, by Mr. H. Hollings and Dr. E. W. Smith, ought to evoke an excellent discussion. There are reports on the use of creosote in the manufacture of carburetted water gas, on the results of an examination of the products of combustion from gas appliances, on the protection of wrought iron tubing, and on the behaviour of refractory materials in continuous vertical retorts. Altogether the meeting should prove of the greatest value to our industry.

Education and Instruction.

WE are impressed by the lecture which Prof. Sir William J. Pope, K.B.E., F.R.S., delivered before the British Science Guild on Thursday last; it was a cultured essay flavoured by philosophic reflections, and it comes as a timely reminder that quack remedies yield nauseating results. It is, for example, delightfully refreshing to hear, in these days of "progress," a man with sufficient belief in his fellow-creatures to say that many thousands of years ago man existed on this planet as a creature practically indistinguishable, physically and mentally, from his descendants of to-day. We make no apology for the following lengthy quotation from Sir William Pope's lecture: "The evidence which proves that modern man is to no appreciable degree the intellectual superior of his predecessor who lived on the far fringe of historic time is overwhelming. Thousands of years since, languages were invented which were probably more expressive and flexible than any modern tongue; great literature sprang into being depicting every human emotion and aspiration with a delicacy and perfection which still remain unsurpassed. Five thousand years ago the goldsmith and the sculptor were producing gems of art of such loftiness of conception and skill in execution as defy modern competition. It may, indeed, be asserted that in many of the arts, in literature, and perhaps also in such abstract subjects as moral philosophy, no progress has been made for many centuries past; no novel conception has been introduced, and the only change consists in the re-presentation of the age-old material in a form which meets the taste of the current period."

There is much truth in the foregoing. Too much of the salesmanship methods and advertising to-day—though no one would be so foolish as to suggest that either was not essential to modern business—caters for the non-thinker. On every hand research workers are, under stress of modern industrial conditions, becoming—in most cases through no fault of their own—lop-sided. Political war-cries are ruining, or doing their utmost to ruin, industries built up by years and years of painstaking scientific effort. Charm of expression is dwindling in a muck-raking competition. We are, in fact, living in a pseudo-scientific era. We are not downhearted, because we think that industrial conditions will force pseudo-science to give place to a closer and less biased consideration of facts; the present period is, we believe, one of transition, though not one of which to be unduly proud. The best thing we can possibly do is to cultivate the virtues of the past in order to bring a satisfying symmetry to a new orientation of existence.

In speaking of cultivating the virtues of the past, we do not suggest a copying scheme to endeavour to resuscitate the dead, for the dead are very dead. But we do suggest that the mode of attack practised towards practically every problem by the workers of long ago is a *sine quâ non* of future development. The present political outlook on the relative merits of gas and electricity, for instance, surely demands remedy. Again we quote Sir William Pope: "Since modern industry consists in the application of science to industry, and can only remain successful so long as it is carried out on scientific lines, it would seem natural to conclude that yet another condition is essential to success; by success I mean, of course, that it should serve national or even international needs with economy and efficiency. This further condition is that when every modern industry makes contact with legislative or other controlling bodies it must be treated scientifically; the facts relevant to any particular situation which may arise must be ascertained, logically marshalled, and subjected to the consideration of scientifically trained minds in order that the correct course of action shall be determined. There is, unfortunately, little ground for believing that this essential condition is always present to the minds of our legislators; and yet it would not seem difficult to understand that a complicated and delicate scientific instrument such as one of our modern industries would be wrecked by unscientific handling."

Finally, we arrive at the title of this article—"Education and Instruction." As an industry and as a nation we need, not less instruction, but more education. Modern industry is more and more demanding that youth should have an early education in science; and more and more this demand is being met by instruction instead of education. The latter expands the powers and resources of the mind; the former fills it with information. A right balance of education and instruction is unquestionably a need of the day.

U.S.A. and the Therm.

THE People's Gas Light and Coke Company of Chicago has adopted the therm. In August last the cubic foot rates were corrected to the therm basis so as to avoid any change whatever in the consumers' bills, except for slight reductions for large consumptions, to avoid fractions. The Illinois Commerce Commission has jurisdiction over the rates and standards of all gas undertakings in the commonwealth, and the requirements are,

looked at from this country, peculiar. Gas distributed at low pressure must have an average monthly calorific value of 565 B.Th.U., the allowable daily minimum being 530 B.Th.U. An allowance of 35 B.Th.U. is made for gas distributed at high pressure, which is construed as 5 lbs. or over per sq. in. Chicago falls into the latter category, and maintains a calorific value of 530 B.Th.U., which is comparable with this country. Chicago's scale of charges for domestic purposes under the therm system does, however, differ markedly from anything which we have seen in Great Britain; and it bears out our contention that scales should be graduated in small increments. The People's Gas Light and Coke Company's rates are as follows: The first 2 therms are charged at 58 cents (with a minimum charge of 60 cents per month); the next 24 therms at 17 cents per therm; the next 239 at 16·9 cents per therm; and all over 265 therms at 16 cents per therm. The important feature about this scale is that 2 therms of Chicago's gas is equivalent to less than 400 c.ft., and that a further reduction is made after the consumption of less than 5000 c.ft. On a quarterly basis, the reduced rates would become effective at approximately 1200 and 15,000 c.ft.

The American Gas Industry is at present devoting much attention to the adoption of charging on the thermal basis; and the matter has been discussed frequently of late in the Gas Press of that country. In last month's "American Gas Journal," Mr. H. T. East, President of the Illinois Gas Association, remarked that some of the gas engineers in the United States feel that a thermal unit should be adopted which would more nearly approximate to the thermal contents of the current billing unit—the 1000 c.ft. "But," he says, "there are admitted advantages in using units already established;" and it appears that the therm will be generally used when the basis is changed to heat-unit charging. The question of a heat unit larger than the therm is discussed by Mr. E. R. Weaver, Bureau of Standards, Washington, in a recent issue of the "Gas Age-Record;" and he would prefer the use of the million B.Th.U. rather than the therm as a unit for billing, "mainly because the existing calorific standards and the ratings of appliances are expressed in B.Th.U. and their relations to the unit of sale would at once be obvious." He goes on to say that the relationship between the American unit for rating gas appliances—viz., 1000 B.Th.U. per hour—and the proposed unit of sale (one million B.Th.U.) would be of even greater advantage to the gas industry, "both because it cannot be misunderstood as readily as the relationship of watts to kilowatt-hours, and because the non-uniformity of service conditions in the gas industry and the necessity of adjusting appliances to local conditions make a knowledge of the energy relationships by appliance salesmen, fitters, and users of much greater practical importance than a corresponding knowledge of electrical units among those concerned with electrical service." Mr. Weaver suggests that the only reason why we in this country adopted the therm was the convenience in expressing the rate in English currency. One million B.Th.U. would closely approximate 1000 c.ft. of natural gas or 2000 c.ft. of manufactured gas in the United States; and the rates for both, he maintains, would be more simply expressed in the larger unit—"to state the rate per therm would frequently involve fractions."

The foregoing has added interest in view of the opinions of several of our readers that a much smaller unit than the therm—one which is either the thermal equivalent of the electrical unit (3412 B.Th.U.) or slightly larger—is needed to-day in order to meet the halfpenny-a-unit sales talk of the electricians. The "JOURNAL" has already recorded that two undertakings in this country have adopted such a small unit. One is Halifax, with a unit of 4000 B.Th.U.; the other Macclesfield, with a unit of 3412 B.Th.U. The Macclesfield Corporation Gas Department have increased their standard calorific value to the unusual one of 511·8 B.Th.U. per c.ft., so that 1000 c.ft. equals 150 "units." For domestic supply they charge 0·3d. per unit for the first 4500 "units" per annum, and 0·233d. for all in excess of 4500 "units." This is equivalent to a reduction in charge after a consumption of 30,000 c.ft. per annum—7500 c.ft. per quarter, compared with Chicago's 1200 c.ft.

Unemployment Grants.

As noted in our Editorial Columns of Nov. 5, the Court of Appeal have reversed the ruling of Mr. Justice Rowlatt in the case of the Seaham Harbour Dock Company *v.* Crook (H.M. Inspector of Taxes). Subject to an appeal by the Crown to the House of Lords, therefore, such grants are not taxable income. In arriving at this decision, the Master of the Rolls placed particular emphasis on the fact that the application of the Company to the Unemployment Grants Committee did not contain "a single word about a guarantee or interest, or anything of that kind," and drew the conclusion that the offer of the Committee "to sanction a grant equivalent to half the interest as a rate not exceeding an average up to 5¼ p.ct. per annum on approved expenditure met out of a loan," for a period of two years, did not constitute "annual interest" within the meaning of the Income-Tax Acts. He regarded this offer as a response to an application for financial assistance in the form of additional capital; with the proviso that the amount of the sum thus promised was to be calculated by reference to a formula contained in the letter from the Committee—that is, on the basis of the expenditure actually met out of the loan in the respective accounting periods.

The Master of the Rolls, therefore, gave it as his considered opinion that the grants thus paid over to the Company during the years 1924-28 were, in effect, an addition to the amount of capital which was available to enable a start to be made at once on the dock extension. He added: "When one has come to the conclusion that the facts are as I have stated, that the two documents before us must be interpreted in law as I have interpreted them, it seems to me that it is impossible on these facts to make a claim that these items paid over by the Unemployment Grants Committee should be included in revenue subject to income-tax." The judgment then goes on to affirm the view expressed in earlier cases, that the fact that the instalments of the grant have been credited to revenue in the accounts of the Company "neither inures in their favour or against them if the true effect and substance of the matter grants them relief or imposes a liability."

Thus another aspect of the case on which the Crown relied was dismissed from consideration, and the four main contentions advanced by Counsel for the Company before the Commissioners of Inland Revenue were upheld by the Court. They were reiterated by the Master of the Rolls as follows: (i.) That the grant was made by a Government body, and was capital. It was not specifically made for the purpose of meeting interest, but was expressly made in respect of expenditure, and for the purpose of helping the Company through with its cost of construction. (ii.) That the term "equivalent to half the interest" was only a method of calculation for arriving at the amount of the grant to be paid. (iii.) That there were no trading and no revenue at that time, and that there were no profits or gains in carrying on a business or trade. (iv.) That the case Pretoria-Pietersburg Railway Company, Ltd., *v.* Elwood was distinguishable. It is suggested that these points would prove useful as "grounds of appeal" in similar circumstances.

As well as expressing approval of the Company's view that the Pretoria case was to be distinguished from the case under appeal, the Master of the Rolls was equally emphatic that two other precedents cited by the Revenue Authorities were inapplicable. The case of Blake *v.* Imperial Brazilian Railway (1884) was distinguishable as merely in accordance with Mersey Docks and Harbour Board *v.* Lucas (1883)—in which it was held that liability to tax attaches to profits or gains irrespective of their application (*e.g.*, to a sinking fund)—while the decision in Nizam's Guaranteed Railway Company *v.* Wyatt (1890) followed the same line of reasoning, which was the keynote to both cases.

Lords Justice Slesser and Romer concurred in the judgment delivered by the Master of the Rolls, and an Order was directed to be made for the assessments of the Company to be discharged, and for any tax paid thereunder to be repaid with interest. Counsel representing the Company were not called upon to argue the case for the appellants.

Medium-Temperature Cokes.

In the "JOURNAL" some time ago we referred to Prof. S. W. Parr's mid-temperature (1200° to 1500° Fahr.) treatment of coal by the system developed at the University of Illinois. The idea is to preheat the coal to about 500° Fahr., charge it into an oven of standard type maintained at the usual temperature, and push the charge after five hours. Those who desire a detailed description of the process will find it in the Transactions of the Second International Coal Conference. Prof. Parr maintains that by his system he can simultaneously satisfy the requirements of a domestic market for gaseous and solid fuel, and of an industrial market for solid fuel. He says that a domestic coke should have, among other qualities, an ignition temperature of about 270° C., that his system can produce such a fuel, and that this fuel functions admirably in the water gas plant or in the power station. He and Mr. D. R. Mitchell (also of the University of Illinois) have recently investigated the friability of these mid-temperature cokes; and they presented their findings at a meeting of the Division of Gas and Fuel Chemistry of the American Chemical Society. All coals were preheated in the neighbourhood of 300° C. and then charged hot into the coke oven, the coke-oven temperatures ranging from 750° to 900° C., and the coal being charged in 1-ton lots. The samples upon which the tests were run were selected as being representative of a great number of coals. The coals from which the cokes were made were not cleaned in any way; in fact, most of the samples carried considerable free impurities in the form of slate and pyrites. Undoubtedly the same coals cleaned would make a much stronger coke. The results of shatter tests (Bureau of Standards method) "tend to show that mid-temperature cokes were somewhat tougher than cokes made from high-temperature processes. Cokes made at 750°-900° C. contain from 4 to 5 p.ct. of volatile matter, and make a very desirable domestic fuel, being smokeless, having a low ignition temperature, and being of high physical strength."

Volatile Matter Determinations.

While carrying out some work in connection with the volatile constituents of coal, Mr. J. A. Addlestone, of the Virginia Polytechnic Institute, found that the percentage of volatile matter as determined with platinum crucibles differed appreciably from the percentage found when using illium crucibles. The determinations were made in the usual manner (Bureau of Mines). One-gramme samples of the coal were heated for seven minutes in a Fieldner volatile-matter furnace. The figures relating to this work are set out in the Analytical Edition of "Industrial and Engineering Chemistry" (Oct. 15), and they indicate that the volatile-matter determination made in the illium crucibles gives results consistently lower than those obtained by the standard method with the use of platinum crucibles.

Gas Analysis.

J. R. Campbell and T. Gray, of the Royal Technical College, Glasgow, have recently carried out an investigation into the combustion of methane by means of copper oxide ("J.S.C.I.," Nov. 7). The results show that at temperatures below 280° the amount of carbon dioxide formed with moderate periods of contact of methane and copper oxide is practically negligible. From 280° up to 400° the rate of oxidation of the methane is very slow; as the temperature is further increased the amounts of methane oxidized tend to a maximum value for any one temperature, and are relatively little influenced by the time of contact, provided this is not small. At temperatures above 700° the rate of oxidation is very rapid, and complete combustion is effected within 7 minutes. Considering the application to the fractional combustion method of gas analyses, the results obtained point to the necessity of oxidizing hydrogen and carbon monoxide at temperatures not exceeding 300° if methane is the only other combustible gas present.

Institution of Chemical Engineers.

The President, Mr. J. Arthur Reavell, and his daughter, Mrs. J. F. Attenborough, received the guests at a reception which was held at the New Burlington Galleries on Wednesday last.

A Governor to Every Meter.

An article on later pages describes a system of gas distribution which has been introduced in several towns on the Continent and which is well worthy of close study in this country. It is a commonplace that, with the growing demand for gas for lighting, heating, and cooking—particularly the latter two applications—distribution systems are being taxed to the utmost and distribution charges are becoming exceedingly heavy. It is, of course, all a matter of supplying an adequate amount of gas at an appropriate pressure (not less than 2 in. W.G.) to every consumer on the district, however remote he may be from the manufacturing station. With the rapid extension of the load, this can be done in two ways. The first is to lay separate feeder mains and connect them either directly or through district governors to the distributing mains. This method is necessarily costly on account of the extra mains and the supervision entailed, and in certain cases it is not feasible owing to congestion of the subsoil of modern thoroughfares. The other plan, which is the basis of the article, is to increase the pressure in existing mains and to install pressure governors on the inlet of every consumer's meter. The particular system described is the "Progas," according to which the pressure in the distribution mains is raised to any desired figure, up to 20 in. W.G., and is reduced to 2 in. or 3 in. W.G., as required, by governors fitted on the inlet to the consumers' meters. The advantages claimed include: A uniform and adequate pressure to all consumers of the district; a direct supply of gas can be made to restaurants, trades, and industrial users without the installation of separate compressors; the carrying capacity of the distributing mains is increased considerably, and this increase entails no disadvantage; the influence of the increase in district pressure is felt in house services, and riser and supply pipes of tenement houses and office buildings; the cost of distribution is appreciably reduced. The "Progas" governor itself, which will be described and illustrated in detail in a later article, differs from the ordinary pressure governor in that it aims at a uniform pressure on the inlet to the various gas appliances. The gas pressure on the immediate outlet of the governor varies with the gas consumption, and counteracts the loss of pressure in the services which is caused by an increase in the flow of gas.

H_2S Removal by Iron Oxide.

We call attention to a paper dealing with an investigation into the effect of humidity in the iron oxide purification process, which, carried out by C. G. Milbourne and W. J. Huff, of the Department of Gas Engineering at Johns Hopkins University, was presented at the annual meeting of the American Gas Association. While it has been recognized that there is an optimum water content for the oxide if the best results are to be obtained, and it has been noted that the water vapour content of the gas stream has some effect on this content, it would appear that former investigators have placed the emphasis on the water content of the oxide itself rather than on the gas stream. The authors observe that no information has hitherto been available to indicate the correct humidity conditions for maintaining the optimum moisture content of the oxide; nor has any attempt been made to differentiate between the effect of humidity on the sulphiding reaction and its effect on revivification. Their experiments show that moisture conditions favourable to one may be unfavourable to the other. A laboratory procedure is described in detail for sulphiding iron oxide under observation with the control of variables such as temperature, humidity, and surface. The laboratory investigation showed that the rate of revivification is markedly affected by humidity conditions, and increases rapidly with increasing humidities. In consequence, purification involving simultaneous revivification *in situ* requires constant high humidities. The use of humidities approaching saturation is, however, inadvisable if conditions permit free deposition of water, as, of course, this deposition greatly lowers the efficiency of the process. The information gained in the laboratory was applied to large-scale operation, and the results confirmed the conclusions drawn. The experimental data presented in the paper were taken from a thesis submitted for the Degree of Ph.D. in Johns Hopkins University.

Proof Positive.

By a special display arrangement, the "Evening Standard" sometimes emphasize particular items of the day's news; and last Monday the following appeared in this way: PROOF POSITIVE.—Just as Counsel in the King's Bench Division said to-day, "Every electrical device in the world is liable to go wrong," every light in the Court immediately went out. A fuse was reported to have "blown." Mr. Justice Acton, to Mr. Martin O'Connor (the Counsel who made the remark): "Well, that certainly supports your argument, but I am sure no one will say that you did it on purpose." [Laughter.]

Protection for New Industries.

Speaking at the annual dinner of the Incorporated Accountants' Newcastle-upon-Tyne District Society, Mr. Henry Morgan, F.S.A.A., President of the Society of Incorporated Accountants and Auditors, said that, while wishing to avoid political controversy, he had been forced to the conclusion, as a result of his professional experience, that, with the change in manufacturing methods at the present day, whereby the volume of output affected so greatly the cost of production, it was exceedingly difficult to establish successfully a new industry unless the producers were assured of the home market. New industries, if they were deprived of a large part of the home market, were under a crippling disadvantage as compared with their foreign competitors, who, in addition to having their own market protected against British competition, and with the advantage of lower wages, were allowed to supply a part of the English market. As to the contention often advanced that a protective tariff must have the effect of raising prices, in many cases it would have the opposite effect, because the resulting increase in the volume of the output would so lower the cost of production that the price to the user would be reduced.

TWICE MAYOR OF ALDERSHOT.

Councillor R. W. Edwards, J.P., Again Honoured.

Under the happiest auspices, Councillor R. W. Edwards, J.P., well known to "JOURNAL" readers as Chairman and Managing-Director of the Aldershot Gas, Water, and District Lighting Company, and Chairman of the Gas Companies' Protection Association, has entered upon his second term as Mayor of the Borough of Aldershot. To be asked to thus accept office for a second year is a great honour; but that it is a thoroughly well deserved one was proved by the remarks regarding the splendid work done by the Mayor and Mayoress during the past year which were made in the Council when thanking Councillor Edwards for all that had been accomplished by him in his first term.

These remarks were repeated at the Mayoral Banquet last Friday, when some 250 guests were invited to take part in

a brilliant function in the Army Gymnasium at Aldershot. In proposing "The Borough of Aldershot," Viscount Wolmer, P.C. (Member of Parliament for the Division), then declared emphatically that there was no more popular or more enterprising member of the Council than the Mayor. To this toast the Mayor suitably replied. "Our Imperial Forces" was submitted by Councillor H. M. Foster, and acknowledged by General Sir David G. M. Campbell, K.C.B. On arrival, the guests were received by the Mayor and Mrs. Edwards, and their daughter; and among those present were noted Mr. R. Bruce Anderson (Vice-Chairman of the Gas Companies' Protection Association), Dr. C. F. T. Blyth (Parliamentary Agent), Mr. Thomas A. Braddock, Mr. C. P. Crookenden, Mr. B. R. Green, Mr. J. F. Ronca (Gas Administrator, Board of Trade), Mr. Leo Taylor (Freeman of the City of London, who is also Official Gas Examiner for the Aldershot District), Mr. W. M. Mason (Manager of the British Commercial Gas Association), Mr. W. J. Smith (Secretary of the National Gas Council), and Alderman David Sparvell, J.P., C.C. (Chairman of the Yorktown (Camberley) and District Gas and Electricity Company), with one or two of his colleagues and the Engineer, Mr. H. J. Randall, and Secretary, Mr. H. G. Hards. There were also Mr. F. A. Ricketts, Secretary, and Mr. A. V. Barraclough, Engineer, of the Aldershot Company.

Bounteous hospitality, interesting speeches, and an excellent musical programme—rendered during dinner by a portion of H.M. Royal Artillery Band—combined to make up a memorable evening.

PERSONAL

At St. Andrew's Kirk, Colombo, Ceylon, on Nov. 12, Mr. GEORGE E. HAMILTON KEILLOR, eldest son of Mr. and Mrs. George Keillor, Knocknair, Greenock, was married to Kathleen Marshall, second daughter of the late Mr. W. F. Smith and Mrs. Smith, Westerlea, Dunfermline.

The result of the recent election for the South Metropolitan Gas Company Employee Director shows that Mr. VERNON HEWES, who polled 3429 votes, has been elected in place of Mr. W. A. S. Theobald, who received 2843 votes.

OBITUARY

THOMAS HENRY MARTIN.

The memories of many of the older readers of the "JOURNAL" will be stirred by news of the death last Sunday, in his 87th year, of Mr. Thomas Henry Martin, who passed peacefully away after a short illness, at his residence, "Windermere," Mount Pleasant Road, Hastings.

Mr. Martin was for 35 years Engineer and Manager of the Barnet District Gas and Water Company, retiring from that position in 1908. He also held other appointments, and was at the date of his death Chairman of the Harpenden District Gas Company. Previous to 1874, he was Assistant to his brother, Mr. John Martin, Engineer and Manager of the Ormskirk Gas Light Company, and afterwards was appointed Engineer to the London and North-Western Gas-Works at Crewe. From Crewe he went to take up the appointment at Barnet.

Deceased was at one time a member of the East Barnet Valley Urban District Council, and of the School Board Committee; while in Masonry he will be remembered as one of the first initiates—1878—of the "Evening Star" Lodge, of which he was a Past-Master, and filled the office of Treasurer from 1898 to 1907. Mr. Martin was an associate member of the Institution of Civil Engineers and a member of the Institution of Gas Engineers.

Sympathy in their bereavement is extended to the widow, five daughters, and three sons. One of the sons, Mr. E. H. Martin, is, it may be mentioned, Managing-Director, Engineer, and Secretary of the Harpenden District Gas Company.

The funeral will be at the Great Northern Cemetery, New Southgate, to-morrow, Thursday, at 1.15 p.m. No flowers, by request.

GAS SERVICE - - -

Discussed from the viewpoint of the Gas Salesman.

Surprising Results of "Sale" at Newcastle.

That the mere word "Sale" is enough to bring some consumers to the showrooms who might never visit them ordinarily has again proved itself at the Ninth Annual Sale at the Newcastle-upon-Tyne and Gateshead Gas Company's showrooms. During the "Sale," which lasted 13 days, 3487 pieces of gas consuming apparatus were disposed of on sale, hire-purchase, and hire, while the number of non-gas consuming appliances amounted to 9316, bringing the total figures to 12,803. The total value of the sales amounted to over £6800. A pleasing feature of this year's sale lay in the fact that twelve times as many gas fires were sold as against the number taken on simple hire, although an inducement of a free hire for first quarter was made on hired fires during the sale period. The sale is carried on simultaneously at all six showrooms of the Company, and the results certainly show what can be done by a forward sales policy, even in an area badly affected by trade conditions. Special concessions were allowed during the sale of free hire rental for first quarter on gas fires, cookers, &c., and a rebate of one quarterly payment on appliances on hire purchase. Bargains in good second-hand and shop-soiled gas appliances were displayed, and concessions made on water heaters, coke fires, and boilers, &c. Special complete offers were made in lighting fittings and burners, and it is interesting to note in these days of electrical competition that an increased number of lighting burners were sold compared with the sale last year. The Company publish a special 12-page catalogue with striking cover which deals solely with their sale.

Gas Fires and Artistry.

The Managing Director of Messrs. Reville, Ltd., Mr. Edward H. Symonds, who is also President of the British Fashions and Fabrics Bureau, during the course of an address to the members of the Bradford Textile Society, said that the most successful and profitable results in the field of industry generally are obtained to-day by the practical mind of the technician being harmonized with the temperamental, but truly artistic, mind. Considerable success has, he said, resulted from the British Commercial Gas Association having approached a President of the Royal Institute of British Architects for help and guidance in beautifying such a prosaic domestic article as a gas-fire. "Can you imagine anything more inartistic than a pre-war gas-stove? Compare the present position of the gas industry with that of former days. Whatever style your dining room drawing room, or your business office may be—whether your scheme is one of artistic simplicity or dignified and beautiful elaboration—you can now obtain a gas fire that is in perfect harmony with your decorative sense. Thus, by following the trend of fashion in regard to interior decorating, the gas industry has sold more fires and has increased the national consumption of gas."

Nursery Rhymes for Modern Times.

The British Commercial Gas Association have published a series of nursery rhymes by Roger Dundonald, illustrated by William Stewart.

CORRESPONDENCE

Hastings and St. Leonards Science Exhibition.

SIR,—Being now one of the burgesses of this ancient town, I was naturally very interested in reading the report, in the last issue of the "JOURNAL," of the Hastings and St. Leonards Science Exhibition, which I visited myself. The writer of the article, however, is not altogether correct when he says that there is no public lighting by gas here. On the contrary, the historic Memorial Clock, which is the hub of the routes of all public conveyances, is well lighted by means of the older illuminant. There is also another good example at the Railway Station, which is now being rebuilt at a cost of some thousands of pounds by the Southern Railway Company. The station also is illuminated by the Hastings and St. Leonards Gas Company. I have no doubt that Mr. Botley will seize the opportunity of using the station approach for a striking illustration of the latest in high-pressure outside lighting. Hastings is strikingly progressive, and the Corporation not slow to follow any good example. To verify this it may be remarked that, as soon as the Gas Company started to put a handsome new façade on its extensive premises in Queen's Road, the Electricity Department of the Corporation replaced the old-fashioned shop front of their showrooms by an excellently designed and constructed plate-glass fitment in which are exhibited some striking advertisements of the incandescent domestic lamps, electric cookers, heaters, &c. Here surely comes home the adage that "Competition is the soul of business." *Verb. sap.*

WALTER T. DUNN.

72, Elphinstone Road, Hastings,
Nov. 13, 1930.

FORTHCOMING ENGAGEMENTS

Nov. 20.—GAS COMPANIES' PROTECTION ASSOCIATION.—Annual General Meeting at Caxton Hall, Westminster, 2.30.

Nov. 21.—SOUTHERN ASSOCIATION OF GAS ENGINEERS AND MANAGERS.—General Meeting in London.

Nov. 21.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—J. M. Webber, "Electrical Plant as Applied to Gas-Works."

Nov. 21.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to Beattie's Bakery, Dennistoun, Glasgow.

Nov. 22.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting at Bradford.

Nov. 24.—INSTITUTION OF GAS ENGINEERS.—Meetings of Executive Committee, 2 p.m.; Finance Committee, 3.30 p.m.; Council, 4 p.m.; at 28, Grosvenor Gardens, S.W. 1.

Nov. 25-26.—INSTITUTION OF GAS ENGINEERS.—Autumn Meeting at the Incorporated Accountants' Hall, Victoria Embankment, W.C. 2.

Nov. 29.—NORTH OF ENGLAND GAS MANAGERS' ASSOCIATION (AUXILIARY SECTION).—Meeting at the Gas Office, Newcastle-on-Tyne, 2.30.

Dec. 3.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Visit to Gas Light and Coke Company's Meter Works at Willesden.

Dec. 6.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Meeting and Visit to Gas-Works, St. Andrews.

Dec. 6.—MIDLAND JUNIOR GAS ASSOCIATION.—Visit to Cannock and Rugeley Collieries, Hednesford.

Dec. 6.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Paper by Mr. W. A. Currie, of Glasgow, on "Continuous Verticals."

Dec. 6.—MANCHESTER AND DISTRICT JUNIOR GAS ASSOCIATION.—Visit to Messrs. J. & J. Braddock's, Globe Meter Works, Oldham. Paper by Mr. E. S. Davies, of Stretford, on "Waste-Heat Boilers with Horizontal Settings."

Dec. 6.—WESTERN JUNIOR GAS ASSOCIATION.—Visit to G.W.R. Gas-Works, Swindon.

Dec. 9.—INSTITUTION OF GAS ENGINEERS.—Meetings of the Executive Committee, 10 a.m.; Finance Committee, 12 noon; Education Executive Committee, 4 p.m., at 28, Grosvenor Gardens, S.W. 1.

Dec. 9.—NATIONAL GAS COUNCIL.—Meeting of Central Executive Board, 28, Grosvenor Gardens, S.W. 1.

Dec. 10.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to Messrs. G. & J. Weir, Ltd., Cathcart, Glasgow.

Dec. 11.—MIDLAND JUNIOR GAS ASSOCIATION.—Paper by Mr. J. H. Wainwright, of Halesowen, "An Automatic Seal Arrangement for C.W.G. Plants."

Dec. 12.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Two short Papers—(1) "Refrigeration," by Mr. L. W. Andrew, B.A., B.Sc.; and (2) to be arranged later.

Dec. 13.—YORKSHIRE JUNIOR GAS ASSOCIATION.—Meeting at Leeds. Paper by Mr. L. Hartley (Messrs. Clayton, Son, & Co.) on "Waterless Gasholders."

THE NEWS OF THE WEEK

The Taunton Gas Company took the opportunity of the visit to that town on Wednesday, Nov. 5, of the annual show of the South Western Federation of Master Bakers' Associations to display an attractive and representative range of cookers and other gas appliances, the stand being in charge of Mr. B. Smith.

The Eastbourne Gas Company's new issue of £60,000 5 p.ct. debenture stock offered for sale by tender was applied for nearly four times over. No fewer than 112 applications were received, amounting in total to £233,600; and the tenders ranged from £101 per £100 stock to the minimum price of £95. The lowest tender to receive allotment was £98 15s., the average price for the issue being £99 3s. 4d.

The Improvement of the Lighting of East Hill, High Street, Wandsworth, West Hill, Upper Richmond Road, and High Street, Putney, was recommended by the Highways Committee of the Wandsworth Borough Council, in accordance with a scheme submitted by the Wandsworth, Wimbledon, and Epsom District Gas Company, on the lines of the scheme approved by the Council in the area of the South Metropolitan Gas Company.

York Stock Issue.—As will be seen from our advertisement columns, Messrs. A. & W. Richards, of 37, Walbrook, E.C. 4, are offering for sale by tender, on behalf of the Directors of the York Gas Company, £90,000 5 p.ct. redeemable debenture stock, to be redeemed at par on Dec. 31, 1950, at a minimum price of issue of 97 per £100, yielding at that price, allowing for redemption, £5 5s. 5d. p.ct. Tenders for this issue should be received not later than 11 a.m. on Tuesday, Nov. 25.

"Gas Accounts and Costs" was the subject of a recent lecture before the North-Western Students' Society of the Institute of Municipal Treasurers and Accountants (Incorporated) at the Town Hall, Wallasey. The lecturer was Mr. J. Boucher, Borough Treasurer of Wallasey, and he dealt with the history of his subject and the modern methods of recording and accounting by the adoption of mechanical aids. The value of the lecture was enhanced by a practical demonstration of the system of mechanical gas billing and recording in operation in the Town Hall.

Electrically-Illuminated Premises and dwelling-houses in Frankfort Street and King Street, Plymouth, were plunged into darkness on the night of Nov. 14 at 7.58, and remained so until 8.46 p.m., on account of the failure of the electricity supply in the vicinity. The failure was due to a fuse at a sub-station. Nowhere was the inconvenience more felt than at the offices of "The Western Morning News." Coming at a time when the production of the paper was at its height, considerable inconvenience was experienced, and the production was seriously retarded, work on the machines being rendered impossible.

Gasholder Patent Action in Germany.—The "Kolnischen Zeitung" on Oct. 24 announced that the Dortmund Provincial Court had dismissed the action of the Maschinenfabrik Augsburg-Nurnberg against the firm August Klönne for infringement of patent. The M.A.N. asserted that their patent for a liquid sealing of the piston by thick oil was infringed by the construction by the firm Klönne of a movable device with wooden and felt parts with oil lubrication. The M.A.N. took the standpoint that their patent was to be considered as a pioneer patent. The Court founded its rejection of the claim for infringement on the opinion of the Privy Councillors Laskus and Pels-Leusden, of the Imperial Patent Office, who dehied an infringement of patent. The Maschinenfabrik Augsburg-Nurnberg will appeal against the judgment.

British Coal for German Gas-Works is gaining ground. According to "The Times" Engineering Supplement for Nov. 15, in 1927 German municipal gas-works purchased 634,822 tons of the British product, in 1928 the amount was 810,569 tons, and in 1929 it reached 864,262 tons, while the amount of German coal consumed by German municipal gas-works in those three years was 1,669,176 tons, 1,579,700 tons, and 1,631,282 tons respectively. The City of Hamburg imported 28,600 tons more British coal for consumption in its gas-works in 1929 than in 1928, Bremen 7380 tons more, Kiel 9540 tons more, Berlin 34,925 tons more, and, what is a great trouble to the Ruhr coalowners, the Mannheim Municipal Gas-Works consumed 4430 tons more British coal in 1929 than in 1928, and the Karlsruhe Municipal Gas-Works 6690 tons more, in both cases at the cost of German coal.

Roads and Road Construction Year Book and Directory is a new work recently published by the Carriers Publishing Company, Ltd., of 68, Shoe Lane, E.C. 4. This publication should be of value to those engaged directly or indirectly in roadmaking, and the technical section of the book contains contributions by a number of experts. Capt. W. J. Liberty, late Hon. Secretary to the Association of Public Lighting Engineers, has contributed an article on the subject of street and arterial road lighting.

Gas "Shock" for Electricity.

The following statement is taken from the "Manchester Daily Dispatch" for Nov. 12.

The battle for supremacy between electricity and gas in Manchester has taken a surprising turn with a remarkable success achieved by gas. Since the campaign was started two months ago, to secure more customers for gas, based on a new device which enables gas to be switched on in the same way as electricity, 2500 additional consumers have been enrolled. "We never dreamed of such success when we started the campaign," a member of the Manchester Corporation Gas Committee told the "Daily Dispatch." "Hundreds of orders are being held up because the plumbers are unable to cope with the rush of applications to have the new gas switch system installed."

[The gas switch referred to is the "Newbridge," manufactured by the Horstmann Gear Company, Ltd., of Bath.]

The Evening Star Chapter, No. 1719.

Election Convocation.

On Wedensday last was held at the Freemasons' Hall, Great Queen Street, London, the Election Convocation for the year 1930 of the Evening Star Chapter, No. 1719. The Z. chair was occupied by Ex-Comp. W. W. Hammond. In the unavoidable absence of Ex-Comp. Frank West, the H. chair was filled by Ex-Comp. Arthur Valon, P.Z.; the J. chair being occupied by Ex-Comp. Ralph Carr, as usual.

The Officers for the year 1931-2 elected were as follows:

M.E.Z.	Ex-Comp.	Frank West
H.	,,	Ralph Carr
J.	,,	John R Masters
Treasurer	,,	Arthur Eves, L.C.R., P.Z.
Janitor	,,	R. H. Goddard

It was resolved that elections to the remaining offices of Scribe E., Scribe N., P.S., 1st and 2nd Asst. P.S., respectively, Organist, and Stewards be adjourned until the ensuing convocation. The proposal to hold three instead of two convocations annually as heretofore was approved; the additional convocation to take place on the third Wednesday of January at Freemasons' Hall, London. To the retiring M.E.Z. was voted a Past-Principal's Jewel, and Grand Chapter Certificates were handed to Comps. George Coutts, Frank S. Evans, and John Sheridan.

York Gas Company to Issue New Stock.

In order to meet the expense of reconstruction of works, provision of additional plant, and to provide for the growing needs of the business, a resolution was passed at a special meeting on Nov. 13 of stockholders of the York Gas Company, held in the Board Room, to raise new capital by the creation and issue of £90,000 Debenture stock to bear interest at the rate of £5 p.ct. per annum, as will be seen from our advertisement columns.

The Chairman of the Board (Mr. Alfred Procter) outlined the position and said: We have for some years pursued a definite policy of reconstruction of plant, with the object of being in a position to give the best and most economical service to the consumers, and also to meet effectively the growing competition of the State-supported supply of electricity. The steady expansion of business has also made it necessary to provide extensive additional plant to maintain the increasing demand for a supply of gas, the most important of which have been the new vertical retorts and the new gasholder. The capital expenditure in these directions, including new mains, apparatus, machinery,

THE NEWS—continued.

and plant for the years 1924 to 1929 inclusive, stands on our books at the net sum of £72,432, which sum represents the amount by which the capital account is overspent.

Acting upon Messrs. Richards' advice it is proposed that it should be a 5 p.ct. Debenture stock, that the minimum price should be fixed at 97, and that it should be redeemed by the Company at par, at the expiration of 20 years. Thus, allowing for redemption at par, the stock at 97 would yield the investor £5 5s. 5d. p.ct. With regard to the provision of the interest on this issue, our accounts show that the interest on the existing Debenture stock and also on the present issue, is more than three times covered by the net revenue of the undertaking.

The Chairman then moved the resolution, which was carried unanimously.

Whitnash to Install Gas Lighting.

At a meeting of ratepayers of the village of Whitnash it was decided to install fifteen gas lamps for public lighting purposes, the contract to be carried out by the Leamington Priors Gas Company.

The Chairman (Mr. T. Ashford) said that the village was very dark, and public lamps would be of very great benefit. They had made inquiries from the Leamington Gas Company, who were prepared to install square lamps, with two mantles and clockwork control. These would be lighted half-an-hour after sunset until 10.30 p.m. from Oct. 1 to March 31. The total annual charge would be £2 6s. 6d. per lamp, spread over 10 years. This meant under a farthing rate per lamp, or, for five lamps, a penny rate. At the end of 10 years, the lamps would become the property of the parish. The charge, thereafter, would be for maintenance and gas, which would be 29s. a year.

It was asked whether an estimate had been obtained for electric lighting, to which the Chairman replied that it would be generally agreed that electric light was not suitable for the village. One had only to go to Harbury, he said, to see the effect of electric light, and then go to Leamington and see the gas lighting there. The Association of Public Lighting Engineers, he remarked, were strongly in favour of gas for lighting.

Mr. Franklin proposed, and Mr. C. Reading seconded, that the meeting agree to an expenditure on the provision and upkeep of public lamps not exceeding the produce of a rate of 2d. in the £.

Councillor R. Fellowes proposed an amendment that 15 lamps be fitted in the village, equal to a 3d. rate, which was carried by 39 votes to four.

This resolution warrants the expenditure of the produce of a 3d. rate in the parish. Fifteen lamps have been chosen, and they will be erected in the places considered best.

Huge Central Workshops at Rio de Janeiro.

The September number of "Light," the house organ of the Rio de Janeiro Tramway, Light, and Power Company, is largely devoted to a description of the new central workshops of the Company, which were inaugurated by the President of Brazil (Dr. Washington Luiz Pereira de Souza) on Sept. 8.

It is not often that a public utility company, even when dealing with such an amalgamation of electric power, light, gas, tramways, and omnibus traffic, finds itself by the mere fact of its growth under the necessity of abandoning its workshops and building on a new site an entirely new layout designed to employ in the near future some 1600 men constituting in itself an engineering works of no mean size.

This, however, is what has been done in Rio, where the increasing volume of work to be handled has outgrown the capacity of the original shops site; and the Company, looking to future as well as present requirements, purchased some 37½ acres of land near the centre of the city, and has constructed there new central workshops, including timber storage yard served by a 30-ton overhead gantry crane, sawmills, carpenters' and woodworking shops, iron and brass foundries, heavy and light machine shops, wire drawing and cable spinning shops, braiding and insulating shops, and special departments for electric motor building and repairing, street-car construction and painting, and other specialized work to serve all their diverse activities.

All machines, with the exception of one range of light nail-making machines, are operated by individual electric motors, and all woodworking machines, as well as the shops generally, are kept free from dust by a large cyclone dust extractor system, with direct connection to nearly 100 machines for removal of sawdust and planer chips, &c., and to floor openings for the extraction of incidental dust.

Every man has an individual locker for his clothes, and spacious dressing-rooms with ample lavatory and shower bath accommodation are provided. A restaurant capable of seating 600 men at a time forms part of the equipment, and a separate restaurant with accommodation for 100 people is provided for the staff. Permanent medical service is provided at all major plant units of the Rio Light and Power Company, and the medical installation at the new shops is in keeping with the rest of the layout.

The entire plant has cost rather more than a million sterling, and was described by the Master Cutler of Sheffield, who recently visited it, as one of the largest of its type built in any part of the world in recent years.

National Gas Council.

Meeting of Central Executive Board.

A Meeting of the Central Executive Board was held at 28, Grosvenor Gardens, S.W. 1., on Tuesday, Nov. 11—Sir DAVID MILNE-WATSON in the chair.

COAL MINES ACT, 1930.

It was stated that such of the schemes under the Act as had already been published would be reproduced in the Council's Monthly Reports. No scheme for Scotland had as yet been approved.

COMMITTEES OF INVESTIGATION.

The names of the persons appointed to the Central Committee and certain District Committees of Investigation under the Coal Mines Act were reported, and it was stated that a full list would appear in the Council's Monthly Reports as soon as the names were made public.

LARGE-SCALE GAS SUPPLY.

It was reported that, following on a meeting in London of the Joint Committee which was considering this subject, at which were present the Chairmen and Technical Representatives of certain large gas undertakings, together with the Chairmen and Secretaries of the District Executive Boards, it had been decided that each District Executive Board should be asked to convene a meeting for the purpose of discussing the best means of dealing with the question. The South Wales District Executive Board had already held such a meeting, and had expressed the unanimous opinion that immediate steps should be taken to establish an industrial centre in South Wales. A Special Committee was accordingly appointed.

INTERNATIONAL ILLUMINATION CONGRESS, 1931.

It was reported that Mr. Robert Watson, of Doncaster, who represented both the Council and the Institution of Gas Engineers upon the British Illumination Committee from which the proposal for holding an International Commission on Illumination in this country had emanated, had suggested in connection with the meetings of the International Illumination Congress to be held in Great Britain in September next that a paper should be presented on the subject of Public Lighting by Gas in Great Britain, in order that attention might be called to the large amount and excellence of such lighting in this country.

It was stated that arrangements were being made for the Congress to tour this country and inspect the public lighting in a number of large centres, and Mr. Watson suggested that a brochure should be prepared for distribution to the delegates, giving technical data with regard to street lighting by gas in the various towns which were to be visited. The Board supported both these suggestions, and decided to seek the co-operation of the Institution of Gas Engineers as to the best way of giving effect thereto.

A letter was submitted dealing with ways and means of increasing the street lighting load. It was agreed to refer the letter to the Institution of Gas Engineers with a request for an early report.

Satisfactory Progress at Barrow-in-Furness.

At the meeting of the Barrow Town Council on Monday, Nov. 10, Alderman Robert Tyson Dockeray, J.P., was elected the new Mayor. In returning thanks, he gave an outline of municipal activities, and referring to the Corporation's gas undertaking he said:

"The centralization of the gas-works at Salthouse entails the scrapping of the old plant at Hindpool Road, with the exception of the gasholders. The contract for the necessary work has already been let at a cost of £45,100. This scheme has been under consideration for a number of years. The plant at Salthouse was erected in 1917, with a capacity of half-a-million c.ft. of gas per day. From the experience gained, and further investigation, centralization at Salthouse was decided upon as making for economy. Some people may ask, Why extend the gas-works now that electricity is expanding for both lighting and cooking purposes? Figures prove, however, the necessity for gas-works extension also, as we find that the make of gas for the year 1923 was 319 million c.ft., and for 1929-30 420 million c.ft.—an increase of 31·7 p.ct. Owing to the increased de-

mand for gas for cooking and industrial purposes, it was essential that extensions should be carried out at once.

"The contract has been commenced, and, as far as possible, the work will be carried out by local men. It is estimated that the centralization of the works at Salthouse will mean a saving of from £3000 to £4000 per annum. When completed, these works will be capable of turning out nominally two million c.ft. of gas per day, and provision is made for an extra half-million c.ft. per day as a stand-by. Since Walney Island was supplied with gas, 1262 cookers have been fixed, bringing in a revenue last year of £4312, and the supply has been a great boon to the inhabitants of the Island.

"The Chairman of a large gas company, speaking the other day, referred to gas as an ancient and modern article—ancient for lighting and modern for cooking—and stated that he looked forward to further developments in the use of gas for cooking in place of coal fires. It has often been said that electricity will ultimately oust gas undertakings, but the above figures do not suggest this."

Long-Distance Gas Supply.

The conditions prevailing in the German coal and coke industries were exhaustively discussed at the third technical conference of the Rhenish Westphalian Association for Safeguarding Coalmining Interests, held at Essen.

According to the "Times" Trade and Engineering Supplement, members of the Association declared that the provision of Ferngas had meant a reduction of the output of coal instead of an increase, and that the great hopes of the promoters of the scheme that the cities and communes would prefer to import gas instead of coal from which to manufacture it had not been realized. At present 90 p.ct. of the gas produced at the pitheads was consumed by distant industries, the majority of these being shareholders in the Ruhrgas Company, which supplied the gas, only 10 p.ct. of the production being taken by communes.

Dr. Pott, Director-General of the Stinnes group, who has from the outset been one of the most energetic supporters of the Ferngas project, strongly recommended an attitude of reserve for the time being, and urged that it would be advisable to be content for the present with supplying gas to the industries, and not to press the conclusion of contracts with communes at prices that might be regretted later. Dr. Pott mentioned further that the replacement of antiquated coke ovens by modern cokeries was now complete, and that the production per oven unit has been raised by just over 50 p.ct. It was thus possible to produce 34,200,000 tons of Ruhr coke in the year 1929. At the end of this year also there will be works in the Ruhr district with modern plant capable of producing 187,000 tons of synthetic nitrogen per annum.

The Cardiff Engineering Exhibition.

Mr. H. D. Madden on "Gas Fuel in Industry."

On Wednesday, Nov. 12, at the Drill Hall, Dumfries Place, Cardiff, was opened the Ninth Annual Exhibition of mining machinery, plant, and appliances, and general engineering organized by the South Wales Institute of Engineers, in connection with which an "Engineering Supplement" was published by the "Western Mail and South Wales News" on the opening day.

The contents of this publication consist wholly of articles on matters of current interest contributed by experts most of whom are associated with the South Wales coal and metal industries. Mr. H. D. Madden, M.Inst.C.E., Engineer and Manager of the Cardiff Gas Light and Coke Company, and a Past-President of the Institution of Gas Engineers, contributed a most valuable and comprehensive section on the utilization of gas fuel in industry, supported by propaganda matter of the British Commercial Gas Association and the Cardiff Gas Light and Coke Company.

Elimination of Raw Coal.

For the past twenty years, says Mr. Madden, the trend has been towards the elimination of raw coal for domestic purposes and for heat operations in industry, substituting for solid fuel gaseous fuel which is easily controlled, clean, and, above all, economical.

The case for cheap power has been cited as the cure for depression in industry, but if the costs in industry are examined it will be seen that power averages somewhere between 2 and 3 p.ct. of the total production costs, while heat costs are many times greater. As an example we may take the iron and steel industry, where the fuel costs are enormously greater than the power costs.

An abundant supply of cheap and efficient heat is therefore a greater necessity to the British manufacturer than even cheap power, and the country is beginning to realize how far-reaching in our industrial life is this factor.

Mr. Madden went on to speak of the work of the Fuel Research Board, and the particular advantages of gas to industry. Occasionally, he stated, large industries install their own plant to produce supplies of either coal gas or water gas for their heat treatment processes. Two notable examples of this are the large gas-works in operation at the Swindon works of the Great Western Railway Company, and the gas-works at Woolwich Arsenal. Here gas is being used in hundreds of operations where heat treatment is necessary.

He enumerated many of the uses to which gas is put in industry, concluding with the statement that in Sheffield the sale of gas for industrial purposes amounts to 2400 million c.ft. per annum, or no less than 46 p.ct. of the total output.

The exhibition would well repay a visit. While the special interest of the business man, the manager, and the technician is fully satisfied, there is the further purpose of informing the general public regarding the means by which our great industries are carried on and their economic position in relation to the rest of the community.

Corporation Undertakings' Results.

Chesterfield.

The working results have been exceptionally good, the coal having yielded well in both gas and residuals. The value of residuals is reflected in the balance-sheet. Coke, having been in good demand, has more than compensated for the reduced value of tar and sulphate of ammonia. The sales of gas are 4·93 p.ct. below the previous year, owing to weather conditions and electrical competition, especially among the prepayment meter consumers. During the year the question of gas charges was considered, but no alteration was made in the scale which has operated from July 1, 1928. A new agreement for the purchase of coke oven gas has been entered into.

Oswaldtwistle.

The annual report of Mr. A. F. Ames, Engineer and Manager of the Oswaldtwistle Gas Department, for the year ended March 31, 1930, shows that the gas sold was 115,534,100 c.ft., this being 1,264,100 c.ft., or 1·08 p.ct., less than the previous year. Ordinary meters show a decrease in consumption of 2,148,400 c.ft.; prepayment meters an increase of 1,707,400 c.ft.; prepayment meters an increase of 1,707,400 c.ft.; making a total decrease in gas used for domestic purposes of 441,000 c.ft. The gas used for trade purposes decreased by 1,124,900 c.ft. The unaccounted-for gas decreased by 3,217,900 c.ft., or a decrease from 8·32 to 6·01 p.ct. The gas sold per ton of coal carbonized has now reached the figure of 13,228 c.ft. This is the highest figure obtained in the history of the undertaking. The net income from residuals, after deducting cost of handling, carting, &c., was £5400, as against £5521 last year. The revenue expenditure and income during the year was £20,717 and £25,671 respectively, leaving a gross profit of £4954, equal to 13·84 p.ct. of the outstanding debt, as compared with a gross profit of £3739 last year. The net profit of £1452 is carried to the reserve fund.

Sedgley.

The Accounts of the Sedgley U.D.C. Gas Committee for the year show that the profits, after paying loan charges and income-tax, are £2783, out of which £1109 has been expended on capital works during the year. The question of additional holder capacity, purifying plant, and works extension generally is under consideration, and it is hoped that an acceptable scheme will be laid before the Council in the near future. The sale of gas increased over the previous year by nearly 4 million c.ft., but the cost of manufacture and distribution were about the same, as also were receipts—with the reduction of 9d. per 1000 c.ft. in force for the full year.

Exhibition of Gas Appliances.

The vitality and value of the gas industry was clearly indicated at an exhibition of gas appliances organized by the Gas Committee of the Heywood Corporation which was opened in the Hornby Street School, Heywood, on Nov. 10, by the Mayor (Alderman D. Booth, J.P.).

Councillor J. E. Whittaker, the Chairman, observed that much money had been spent at the Heywood Gas-Works in modernizing the plant. Referring to the fact that a two-part tariff had been instituted in Heywood, he said it was possible, with gas at 2s. 6d. per 1000 c.ft., to use a fire continuously at the rate of a penny per hour, while a continuous supply of hot water for an averaged sized family could be secured for 4d. per day.

Mr. Arnold Marsh, General Secretary of the National Smoke Abatement Society, said he was especially glad to be at the exhibition, which showed great enterprise on the part of the Heywood Gas Committee and the officials at the works in emphasizing the value of gas as one of the principal methods of combating the smoke evil. He declared that England was the smokiest country in the world, and had the most children

THE NEWS—*continued.*

suffering from rickets. He also referred to the waste and damage caused by smoke, and said that industrial towns would be far more happy to live in if they were clean and bright.

The exhibition attracted a large number of visitors during the week. Cookery demonstrations were given each afternoon and evening by Miss H. H. Tuxford, M.C.A., and proved very popular, as also did the washing demonstrations in gas boilers. A coke fire in the rest room was greatly admired and was the source of much comment.

The Institute of Fuel.

Formation of Local Sections.

The North-Western Section of the Institute of Fuel has now definitely been formed, and will hold meetings periodically at the Engineers' Club in Manchester. The area covered by the section comprises Cumberland, Lancashire, Cheshire, North Wales, a little of Yorkshire (including Huddersfield and Halifax), and the Buxton district of Derbyshire. The Section is holding its next meeting on Dec. 9, when Mr. Ivor David will read a paper on private generation of electricity *versus* the grid.

At its meeting in London on Nov. 12 the Council of the Institute sanctioned the formation of the East Midlands Section, which is now in being. This Section comprises the whole of the county of Derbyshire except the Buxton area, the counties of Nottinghamshire, Lincolnshire, Rutland, and Leicestershire, and that portion of Northampton north of Kettering. A meeting is to be held in Derby on Dec. 12.

The Institute hopes to increase the number of sections in the provinces during the coming year by at least another three or four.

Gas Exhibition at Cheddar.

Recently the Cheddar Gas Company, in conjunction with Messrs. R. & A. Main, Ltd., arranged a series of afternoon and evening gas cooking demonstrations and lectures, conducted by Miss M. K. Gompertz, M.C.A., at the Central Hall, Cheddar. The exhibition, which proved a great success, was opened on Nov. 11 by Mr. C. F. Dunn, of Wells, who exploded the fallacy that food cooked by gas is flavoured by it. Referring to the improvements which have been effected at the Cheddar Gas-Works, Mr. Dunn explained that they have made possible the reduction of the price of gas to the pre-war level.

One of the most interesting features of the exhibition concerned outside lighting. The appearance of one 5-burner Thomas Glover hanging gas-lamp of 500 c.p. in the Market Cross, showing up as it did the poor effort at street lighting by electricity, resulted in an all-round attack in the shape of seven high-power electric lamps around the Lecture Hall. This flattering attention on the part of the competitor added additional attraction to the effort of the Gas Company at their Exhibition, and it proved more conclusively to the whole town the greater efficiency and economy of gas over electric lighting.

Competition for the Development of the Uses of Aluminium.

A competition open to inventors of any nationality will be held by the International Aluminium Bureau, with the object of encouraging the development of the aluminium industry. Prizes will be offered for the best suggestions for new applications of the metal and its alloys or for improvements in its manipulation.

The competition will be divided into two sections:

Section A—Direct Applications: This section will deal with all proposals relating to the manufacture of an article or machine or part of a machine in aluminium or aluminium alloy.

Section B—Indirect Applications: This section will deal with all proposals relating to improvements in the methods of working or using aluminium or its alloys (*e.g.*, soldering, insulating, plating, &c.).

The prizes offered, which will be awarded in the month of June, are as follows:

1. A prize of 25,000 French francs for the best entry under section *A*.
2. A prize of 25,000 French francs for the best entry under section *B*.

In the event of two or more entries in either of these two sections being judged equal in merit, the Committee may divide the prize money.

3. In addition to the above two prizes, a special prize of 50,000 French francs will be awarded to the author of a suggestion which has exceptional interest or value under either section.

The opening date of the competition will be Jan. 1, 1931; and entries must be sent in between that date and April 1. The results will be announced at the latest by July 1.

Entries must be forwarded by registered post to the Bureau International de l'Aluminium, 23-bis Rue de Balzac, Paris, 8e.

Early Days of the Gas Industry

From the Files of the "JOURNAL"

Lighting Ramsey with Gas.

The following is from an account of the first venture of Ramsey into gas lighting: Mr. Corkhill had the pleasure of beholding his star shining most conspicuously, and eliciting the tremendous applause of the populace as the "northern light." A planet, which we supposed to represent Venus, was brilliantly burning in front of Mr. Teare, draper; and another star appeared over the Saddle Inn. The designs at the Market Place poured out such a flood of light that the most minute article of a lady's toilet might be discovered on the ground. The gas was pure, and considered to be very good, and reflects much credit on all concerned. Mr. Alfred Penny, of London, the contractor, was repeatedly cheered as he passed through the streets, and must have been pleased to receive those stentorian ebullitions of satisfaction. All the shops, hotels, &c., are or will be consumers, and many private houses.

A Dinner Cooked on the Ice.

A singular experiment in gastronomic science was tried on Tuesday last, on the ice in the centre of the River Exe, at St. Thomas. The severity of the frost having coated the surface of the river with a thick crust of ice, capable of bearing several hundred persons who skated and otherwise disported themselves thereon for hours near the bridge, it occurred to Mr. Vickery, Gas Engineer, that a dinner might be cooked by gas in the centre of the icebound stream. The suggestion, made only in the afternoon, was seconded by Mr. Hex, of the Seven Stars, and in less than an hour several of the workmen from Mr. Vickery's establishment had laid down gas pipes from the street main to the middle of the Exe, where the gas supplied a number of little jets in one of Mr. Vickery's improved cooking stoves. In this apparatus a large piece of beef and some poultry were roasted, and a leg of mutton and vegetables, a large Devonshire dumpling, and other etceteras were boiled. It was surely no wonder that so many skaters encircled the scientific cookery, while the savoury steam issued forth with as much delicacy and richness as though the spirit of a Soyer "ruled the roast." The dressing process occupied about an hour and a half, and was witnessed by a large number of persons. The dinner was afterwards served up at the Seven Stars, when between twenty and thirty of Mr. Vickery's friends partook of a capital repast and spent a very convivial evening.

Gas Lighting in Calcutta.

With rebellion, murder, rapine, distrust, and alarm on every hand, the career of improvement in India still remains unchecked. On the evening of July 6 (1857), when the authorities at Calcutta had, or believed they had, occasion to inform the public through the newspapers that a British force at Cawnpore had been annihilated by mutineers and rebels, a part of the city was, for the first time, lighted by gas. The natives were, of course, greatly astonished and perplexed by this exhibition of the new light.

THE "PROGAS" SYSTEM

"Gas Engineer," who describes this system, believes it to be an advance in gas distribution practice.

In these days of keen competition, both gas production and distribution are claiming equal attention by gas undertakings, which are anxious to reduce operating and capital costs of both, and thus the price of gas. While in the past the interest of the gas engineer has been focussed on gas production, the distribution and selling of gas have obtained a more prominent position in recent years. The costly nature of gas distribution is generally acknowledged, and devious methods have been devised with a view to reducing these costs, either by alterations to the present method of distribution, or by systems of charging which will induce the use of gas at times of usually low consumption. This article, however, is not concerned with gas tariffs or sales, which have been dealt with from time to time in a number of papers and articles; it is intended to be a contribution on the subject of gas supply, and an endeavour to further its progress.

In the earlier days of the gas industry, and, indeed, until the end of the last century, low gas pressures in the main—up to, say, 4 in. W.G.—were adequate for most distribution systems. The districts were mostly small, and in large towns several works were usually available for the supply of gas at different points of the district, so that the need for pressures higher than 4 in. W.G. did not arise. The increasing tendency for centralization of production and the growing areas of supply, coupled with the rising demand for gas by domestic and industrial users, taxed the capacity of the existing gas mains to the utmost. At the same time, the flat-flame burner was replaced by the incandescent mantle, heated by a bunsen burner, which requires a higher pressure than the flat-flame burner. As the bunsen burner is also used on other gas appliances for heating and cooking, it is probably mainly responsible for the minimum gas pressure having been fixed at 2 in. W.G. by the Gas Regulation Act of 1920. Usually, there would be sufficient pressure at the distributing stations to meet the requirements of the district, but the increase in pressure at this point is limited, for a number of reasons. The capacity of the gas mains varies directly as the square root of the pressure difference between the two ends of the main, and thus a rise in the gas pressure from, say, 4 in. to 6 in. W.G. increases their capacity

$$\sqrt{(6-2)} - (4-2) = \sqrt{2} = 1{\cdot}42$$

times, or 42 p.ct., when the minimum pressure in the system is 2 in. W.G. in each case.

A gas pressure above 6 in. W.G., however, would cause trouble in the average consumer's appliance, so that it is inadvisable to allow this pressure or more in any part of the distributing system supplying consumers direct. It also must be borne in mind that the increase of pressure in the mains is not wholly effective, inasmuch as the consumer near the works will be induced to take more gas, unless pressure governors are installed on his service. Thus, the more distant parts of the district may continue to suffer from a deficiency in pressure. In any case, a considerable difference between the maximum and minimum pressures in the district would exist, and it is not feasible to design gas appliances which will work satisfactorily over a pressure range of, say, 2 in. to 6 in. W.G. Furthermore, the pressure in the mains would not be constant, but would vary with the hourly, daily, and seasonal fluctuations of gas consumption. Thereby annoyance would be caused to some consumers, and complaints would be the result. The necessity for fitting street lamp governors need not be considered, as they can be looked upon as standard equipment to-day.

Overcoming Difficulties.

The difficulties outlined above can be overcome in two ways. Up to quite recently it has been the custom to lay separate feeder mains, which are connected up directly, or through district governors, to the distributing mains. By this means a fairly uniform pressure throughout the district can be maintained, but the carrying capacity of the district mains themselves is not materially increased. The method can be costly on account of the extra mains and the supervision entailed. Furthermore, it is sometimes impossible to accommodate the additional mains in the already congested subsoil of modern thoroughfares.

The other method consists in a substantially increased pressure in the existing distributing mains and the installation of pressure governors on the inlet of every consumer's meter. The suggestion was first made in 1921 by Spalek, who took up the ideas of Ochelhäuser and Shelton. Six years later he announced a complete scheme. Gas was to be distributed at a pressure of 15 lbs. per sq. in., which was to be reduced on the inlet of the consumer's meter to 7½ lbs. per sq. in., and, further, to ¾ lbs. on the inlet of each gas appliance. At the same time, a similar idea had been developed in other quarters, and found its ready application in the "Progas" system, which has been introduced in several towns on the Continent, with considerable success. According to this system, the pressure in the distributing mains is raised to any desired figure, up to 20 in. W.G., and is reduced to 2 in. or 3 in. W.G., as required, by governors fitted on the inlet to the consumers' meters. The advantages gained are considerable:

(1) A uniform and adequate pressure is ensured to all consumers of the district, irrespective of topographical position.

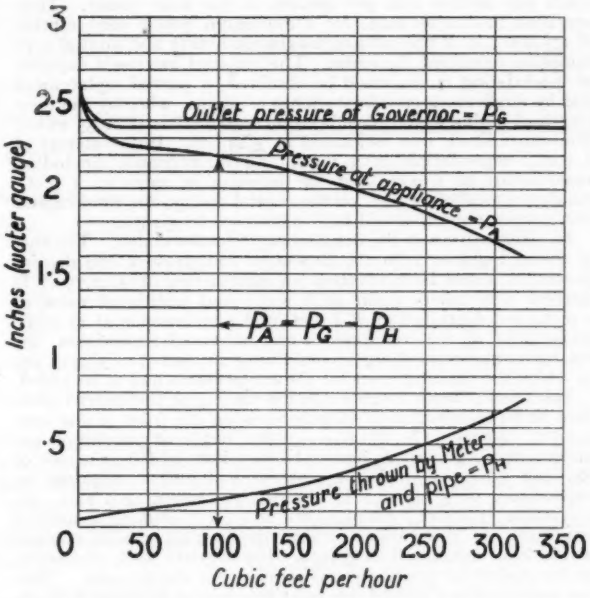


Fig. 1.—Pressure conditions in a ¾-in. gas service, 16½ ft. long, controlled by a "Constant Pressure" Governor, at various rates of gas consumption.

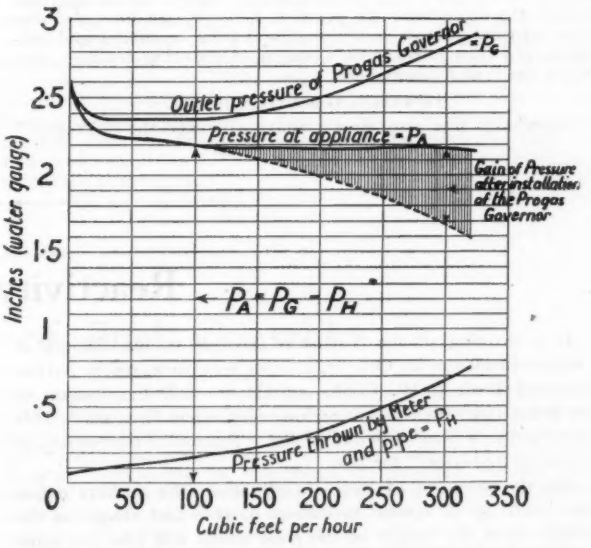


Fig. 2.—Pressure conditions in a ¾-in. gas service, 16½ ft. long, controlled by a "Progas" Governor, at various rates of gas consumption.

(2) Owing to the higher pressure prevailing in the district mains, a direct supply of gas can be made to restaurants, trades, and industrial users without the installation of separate compressors.

(3) The carrying capacity of the distributing mains themselves is increased considerably. For example, when the pressure in the district mains is raised from 4 in. to 20 in. W.G., the capacity of the mains is increased three times. The increase in pressure is fully effective and entails no disadvantage, owing to the complete control of pressure to all consumers.
(4) The influence of the increase in district pressure is also felt in house services, and riser and supply pipes of tenement houses and office buildings, which are frequently under-dimensioned.
(5) The cost of distribution is appreciably reduced, owing to the increase in the carrying capacity of the mains—a point which is worthy of closer study.

A Particular Example.

In a concrete case, an undertaking was faced with the necessity of increasing the size of its mains. The district, which supplied a population of about 50,000, originally took 175 million c.ft. per annum, or 3500 c.ft. per head of population, while the maximum hourly consumption was 87,500 c.ft. The gas consumption increased rapidly, and it was anticipated that it would reach 350 million c.ft. per annum in the near future. Thus provision had to be made for a maximum hourly consumption of 175,000 c.ft. if the ratio of maximum hourly and annual consumption remained the same. The required increased capacity of the existing mains could be obtained by partial replacement and by duplicating certain stretches of mains, whereby the total length of mains would have been increased from 48 to 55 miles. The expenditure was estimated at £24,600. With interest at 6 p.ct., depreciation at 3 p.ct., and maintenance (including supervision) at 1 p.ct. and the increase in rates at 2 p.ct., making a total of 12 p.ct. on the capital outlay, the total capital charges per annum would have amounted to £2952.

An alternative was the installation of feeder mains. The cost of them, together with the necessary compressors and district governors would have involved an expenditure of £12,750. If interest was taken again at 6 p.ct., and additional rates at 2 p.ct., but depreciation at 4 p.ct. and maintenance at 1½ p.ct., on account of the compressors and increased supervision, the total annual capital charges would have amounted to £1705 5s., to which the running costs for the compressors had to be added.

The third scheme consisted in the raising of the district pressure and the installation of governors on the inlet of the consumers' meters. On the basis of five heads of population per meter, 10,000 governors had to be installed, which at a cost of 28s. per governor, including cost of installation, required an expenditure of £14,000. If interest was taken at 6 p.ct., depreciation at 4 p.ct., maintenance at ½ p.ct., making a total of 10½ p.ct., on the capital outlay, the annual capital charges would have amounted to £1470. No boosters were necessary, as the gasholder gave sufficient pressure for the purpose. Thus the latter scheme proved the most economical and also brought incidental advantages, enumerated above.

It might be argued that a higher gas pressure in the mains would cause greater loss of gas from leakage. The flow of gas from an orifice is proportional to the square root of the pressure, and so the escape of gas from mains should follow approximately the same law. In practice, however, an increased district pressure reveals more readily defects in mains and services, and thus it becomes a means of reducing leakage, and hence the " unaccounted-for " gas.

Increased Gas Consumption.

Experience has also shown that, wherever the " Progas " system has been introduced, it has brought an unexpected increase in gas consumption. In one particular case the increased consumption amounted to 20 p.ct.

If the average gas consumption per consumer is 100 therms per annum, charged at 10d. per therm, an increase in consumption of 20 p.ct. would increase the revenue of the gas undertaking by 16s. 8d. per consumer per year. From this figure the net cost of gas must be deducted in order to arrive at the gross profit derived from the increased sale of gas. It is obviously not necessary to debit the gas with costs other than those of manufacture, as distribution and management are unaffected. It is even doubtful whether capital charges and rates should be included.

Cost of Gas Production.

[Per therm.]

	d.	d.
Gross cost of raw materials	4·0	
Revenue from bye-products	2·0	
Net cost of raw materials		2·0
Cost of purification		0·1
Wages		0·6
Renewals and repairs to works plant		2·0
Capital charges		0·5
Rates		0·2
Total		5·4

The value of 20 therms, the increase in gas consumption per consumer, then would be 9s., and leaves a gross profit of: 16s. 8d. − 9s. = 7s. 8d. per consumer per annum.

It is not always realized that an increased district pressure can be made to benefit inadequate house services on the outlet side of the gas meter. These are often found too small when additional appliances, fires or geysers, are installed; and heavy costs may be necessitated through the replacement of old pipes or the fitting of a separate service. The ordinary pressure governor is only designed to maintain a constant pressure on its immediate outlet, and, therefore, will not deal with pressure variations in the services between it and the point of gas consumption, when a varying—and possibly at times inadequate—pressure may be experienced. The " Progas " governor, on the other hand, aims at a uniform pressure on the inlet to the various gas appliances. The gas pressure on the immediate outlet of the governor varies with the gas consumption and counteracts the loss of pressure in the gas services, which is caused by an increase in the flow of gas. The difference between the performance of the two types of governor is illustrated in figs. 1 and 2. It has been assumed that there is 16¾ ft. of ¾-in. pipe between the outlet of the governor and the point of consumption. In the case of an ordinary pressure governor (fig. 1) the pressure on the outlet of the governor remains constant irrespective of the gas consumption; and since the resistance of meter and service increases with an increasing flow of gas, the pressure on the inlet of the gas appliance falls by a corresponding amount. When the gas consumption increases—*e.g.*, from 100 c.ft. per hour to 300 c.ft. per hour—the pressure loss would amount to 5-tenths W.G. (fig. 1). The " Progas " governor behaves differently. While maintaining a normal pressure on the inlet to the appliance, the pressure on its immediate outlet increases with the gas consumption, as indicated by the pressure curves in fig. 2. It is thus evident that the success of the system depends very largely on the type of governor installed, which should possess certain features of design, to be discussed in a subsequent article.

Reactivity of Coke

At a meeting of the Yorkshire Section of the Society of Chemical Industry on Oct. 27, a paper was presented by Arthur Key and Prof. J. W. Cobb, entitled the " Determination of the Reactivity of a Coke to Steam and Carbon Dioxide." This contribution is printed in full in the " Journal of the Society of Chemical Industry " for Nov. 14.

For the purposes of their investigation, the authors define the reactivity of a coke to carbon dioxide and steam as the reciprocal of the weight of the coke which will give the same percentage decomposition of the gas as does unit weight of a standard coke under the same conditions—or, alternatively, as the reciprocal of the length of coke column which decomposes as much gas as a column of unit length of the standard coke. Each definition, they state, has its advantages for special applications.

Applying this definition, curves have been constructed by the use of several cokes varying in reactivity, from which curves the reactivity of any coke may be read off when the percentage decomposition of gas effected by that coke has been measured. Curves are given for:

(*a*) Reactivity to carbon dioxide at 900°, the standard coke of unit reactivity being taken as one of which 10 grammes of pieces passing a ½-in. sieve, but being retained by a ⅛-in. sieve, in a column ¾ in. diameter., will decompose 20 p.ct. of carbon dioxide, supplied at a rate of 5 litres per hour.
(*b*) Reactivity to steam at 1000°, a similar column being used as standard, the unit being 50 p.ct. of steam decomposed when passed at a rate of 10 litres per hour and accompanied by 50 p.ct. of its volume of nitrogen.

The curve of reactivity to carbon dioxide, state the authors, is coincident with one constructed on the assumption that the reaction involved is of the first order.

The curve of reactivity to steam lies between the curves constructed on the assumption that the resultant reaction is (1) of the first order, (2) of the second order.

Hydrogen is found to have a specific retarding effect on the reaction.

IN CONTINENTAL COUNTRIES - - -

Abstract Translations from the Technical Press of France and Germany.

SULPHURIC ACID WASH TEST FOR MOTOR BENZOLE.

F. Knöttner, "Brennstoff-Chemie," 1930, **11**, 432-435 (Nov. 1), shows that the acid wash test does not necessarily give an indication as to the quality of a motor benzole. A high value may be shown by a fuel which is in every respect satisfactory in an internal combustion engine and *vice versa*. He advocates an evaporation test, carried out in presence of air with a view to simulating service conditions. Such a test gives an indication of the tendency of the fuel to give rise to gum formation.

A 200 ml. sample is evaporated in a current of air in a 250 ml. wide-necked flask provided with an air inlet tube reaching below the level of the liquid, a vapour outlet tube, and a thermometer, the bulb of which is in the centre of the flask. The flask is heated sufficiently strongly to ensure that free evaporation of the sample in the air current occurs. An empty flask serves as a trap for some of the evaporated benzole, the remainder being caught in two copper wash-bottles constructed on the principle of Drechsel wash-bottles and packed with activated charcoal. The air current is obtained by use of a filter-pump. It is important to secure that all but a small proportion of the sample is evaporated within a period of 2 to 3 hours. The time required for the completion of the evaporation does not matter. Depending on the quality of the spirit, a small or large resinous residue remains.

It is suggested that this evaporation test should replace the acid wash test, and that it should be specified that the evaporation residue from 200 ml. of the spirit should not exceed 10 mgm.

A table giving the specific gravity, Engler distillation, acid wash figure, bromine number, and evaporation residue of a large number of samples of petrols, motor benzoles, and simple aromatic hydrocarbons is included in the paper. The temperature range of the evaporation in the evaporation residue test is also given for each sample.

FROM COAL TO GAS.

F. Schuster, in an earlier paper ("Das Gas- und Wasserfach," 1929, **72**, 713), had given calculations and heat flow diagrams for the production of a mixed gas (C.V. 440 B.Th.U. per c.ft. at 30 in., 60° Fahr., satd.) by letting down straight coal gas with blue water gas. The figures related to coal carbonized in retorts heated with producer gas made in outside producers.

In "Das Gas- und Wasserfach," 1930, **73**, 1033-1038, the same author gives calculations, tables, and heat flow diagrams for the production from the same coal of a mixed gas of the same calorific value.

(1) From straight coal gas and double gas.
(2) From straight coal gas and producer gas.
(3) From straight coal gas and water gas as made in steamed retorts.

In the first two cases, the retorts are assumed to be heated by producer gas from outside producers, in the last case built-in producers being allowed for. The heat balance of a double gas generator in which water gas is generated from the coal is first worked out. The table shows the overall results of the various combinations. Figures are given also, for a mixed gas prepared from straight coal gas by addition of waste gas.

Basis 1 Ton of Coal.	Mixed Gas from Straight Gas *plus* —				
	Blue Water Gas.	Steaming	Double Gas.	Producer Gas.	Waste Gas.
Cubic feet of mixed gas (C.V. 440) at 30 in., 60° Fahr. saturated	20,830	22,230	22,150	17,160	15,760
Therms	91·6	97·8	97·5	75·5	69·3
Tar (assumed yield), lbs	112	112	112	112	112
Coke for sale (H_2O = 5 p.ct.) cwt.	9·70	10·30	9·76	11·88	12·46
Overall efficiency, p.ct.	84·4	87·7	85·9	88·0	88·5
Composition of gas—					
H_2	50·2	50·0	50·0	39·6	39·1
CH_4	17·7	16·6	16·7	21·5	23·4
CO	21·8	22·8	22·8	14·1	7·0
C_2H_4	1·5	1·4	1·4	1·8	2·0
C_6H_6	0·3	0·6	0·5	0·7	0·8
CO_2	3·7	3·7	3·7	3·9	6·9
N_2	4·8	4·9	4·9	18·4	20·3
O_2	..	..	..	..	0·5
Specific gravity (air = 1)	0·467	0·480	0·480	0·556	0·571

In the case of the gas obtained by mixing straight coal gas with blue water gas, the coal gas is assumed to have been debenzolized with production of 12·5 lbs. of benzole per ton of coal carbonized. The yield of mixed gas is thus less than in the case of the gas produced in steamed retorts, in which case benzole recovery is not practised.

NOMOGRAMS FOR THE CALCULATION OF GAS VOLUMES.

In the use of flow meters of the orifice plate or Venturi type, it is often necessary to calculate the rate of gas flow in terms of the volume at 0° C., 760 mm. Hg, dry.

A. Boehm, in "Das Gas- und Wasserfach," 1930, **73**, 1045-1047, gives a nomogram by use of which a factor is derived for varying conditions of barometric (*plus* working) pressure, temperature, and relative density of the gas and for humidities of zero and 100 p.ct. The range of the nomogram is from 0°-30° C., 720-800 mm. of mercury, and densities (air = 1) from 0·39-0·62. The rate of flow in cubic metres per hour as deduced from the formula applicable to the particular type of flow meter in use is to be multiplied by the factor obtained by use of the nomogram.

Graphical Methods of Fuel Control

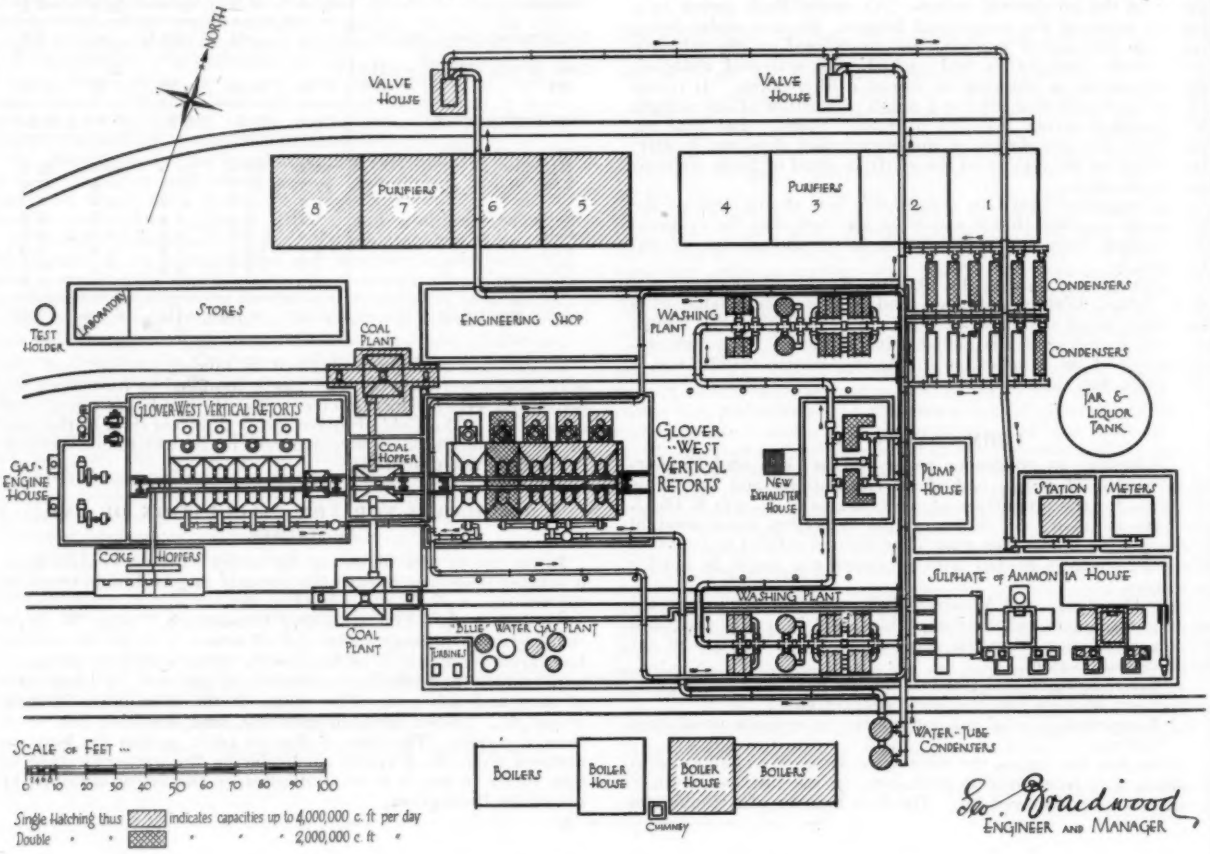
In a paper before the Institution of Fuel on Nov. 12, Mr. J. Cunningham, referring to the town gas industry, said that in this country it had been the custom to charge per unit of consumption, either per 1000 c.ft. or per therm, irrespective of peaks. Various sliding scales have been used based on the total consumption per annum, large consumers being given a reduction in price. This is certainly a step in the right direction, especially as the fixed charge, in the terms used above, is not the main item of cost, but investigations which have been made both at home and abroad have called attention to the fact that many consumers are not bearing their fair proportion of cost, with the corollary that others are being overcharged. It then becomes only a question of time before the latter look round to see if some other fuel may not prove more economical, and once a customer is lost it is by no means an easy matter to regain him.

It need therefore cause no surprise to find that costs are being more and more closely examined, not merely as to their amount but also as to their incidence, and that many schemes are being considered and applied to ensure an equitable distribution of them over those from whom they have to be recovered. Referring to conditions in America, besides the natural resources in water power, which caused the adoption of the type of tariff already mentioned for electricity, there are supplies of natural gas which are in the main only made available by considerable expenditure on pipe transmission lines. So high are the fixed charges on this account that in some cases this fuel, in spite of its low value where it is tapped, is only used for the base loads, the peaks being met by local gas making plants of low capital value but high operating cost per unit of production. The advantage of this combination is, of course, due to the relatively low total output of these local plants, with corresponding low total cost compared with that of the provision for the supply of natural gas.

"UNIT" PRINCIPLE IN WORKS LAYOUT - -

The Works of the Coatbridge Gas Company, which were visited by the Scottish Junior Gas Association (Western District) on Saturday last.

On the completion of the war it was realized that something would have to be done to the plant, which had been working at full stress during that troublesome period. The carbonizing plant in use consisted of 30 beds of 8 horizontal retorts, all hand-charged. The beds all being in need of repair and the method of charging being a very expensive matter, the thoughts of the Directors and Engineer immediately turned to the question of vertical retorts. A contract was placed with West's Gas Improvement Company, Ltd., for an installation of 4 beds of 8 retorts, or 32 retorts in all, each rated at 3 tons of coal carbonized per day. On the completion of the installation all gas-making in the horizontal retorts ceased, and these were gradually dismantled. The savings in working costs showed themselves immediately, for, whereas between 40 and 50 men were before employed in the retort house, the number required for the vertical retorts was only six, two on each shift.



PLAN OF WORKS AS EXTENDED TO A CAPACITY OF 4 MILLION CUBIC FEET PER DAY.

NOTE.—The first extensions to a daily capacity of 2 millions are indicated by double cross hatching, and the final extensions to a capacity of 4 millions by single cross hatching.

The working results from this installation have been consistently good, and when in the winter of 1926 all the beds were necessary to keep the town supplied, leaving no reserve plant, it was with no misgivings that another contract was placed with Messrs. West's Gas Improvement Company, Ltd., for another bed of 8 retorts. This bed was built to the firm's very latest design, their new 5-ton retorts being installed. These retorts have now worked continuously for three years and are as good as on the day on which they commenced work. It was at first thought that the 5-ton units might be too big, but, as a matter of fact, their flexibility and efficiency is such that the only regret is that this design was not available when the original plant was installed.

The coal and coke plant consists of two separate installations, the older plant being fitted with gravity bucket conveyors, while on the new plant the latest lip-bucket type has been provided, by the use of which rotary coke and coal fillers are not required, and wear and tear is considerably reduced.

The electrical current for driving this plant is generated at the works from two 44 B.H.P. "National" gas engines. The conveyor on the latest installation is also coupled to a steam engine, and a scheme is at present under consideration for a similar method of alternative drive on the older plant. The reason for a steam-engine drive being favoured is the fact that gas is not now so cheap to make as it was in the days of high returns for residuals, while coke breeze for boiler fuel is a drug on the market in this district. Another advantage of the steam drive lies in the fact that it provides a stand-by in the event of a breakdown of the electrical plant.

INCREASED STORAGE.

The question of storage capacity was the one which next engaged attention. There were three holders in use, two of 250,000 c.ft. capacity and one of ¾ million c.ft. The two smaller ones were quite incapable of throwing the desired pressure, and were very much in need of repair. It was accordingly decided that one of them should be dismantled, and an entirely new holder put in its place. A contract was placed with Messrs. Robert Dempster & Sons, Ltd., of Elland, for a holder of 500,000 c.ft. capacity embodying the very latest design of gas-holder construction. The existing tank was used and a spiral-guided holder installed. A novel feature adopted was the new method of guiding. This took the form of ball-bearing guides, this holder being the first of its type built in Scotland. The pressure thrown by the holder was given special attention, and when in the third lift a pressure of 12½ in. is obtained.

SULPHATE PLANT.

The next part of the plant to which attention was turned was the sulphate plant. The plant in use had a capacity of 30 cwt. per day, and was quite inadequate for the treatment of the amount of liquor made. The plant was completely reconstructed and modernized, and was placed in a part of the old retort house. The saturators are much bigger than usual, and have proved to have a lot of advantages over the smaller saturators commonly in use. Fishing of the boxes is done by an ejector, which can be worked with either steam or compressed air, a Westinghouse air compressor and storage cylinder having

been installed for the purpose. The plant is planned in such a manner that, even though there are two entirely separate units, both can be worked by one man. A special drying room was built, and this is heated by exhaust steam from the engines, &c., in the works, there being more than enough steam for the purpose.

A Spencer-Bonecourt boiler, to work on town gas, was installed in the sulphate plant. The capacity of this boiler is 1250 lbs. of water per hour, and it has given entire satisfaction.

During the past 18 months two new Waller exhausters have been installed, each of a capacity of 175,000 c.ft. per hour, at a speed of 60 r.p.m. These exhausters have replaced two of the same make of a capacity of 60,000 c.ft. per hour. An entirely new exhauster house was built in such a manner that free access to all connections and pipes under the floor can be easily obtained. A special feature of the pipe layout is that the usual arrangement of exhauster by-pass valve has been done away with. The old exhausters will be dismantled, and the building in which they are housed will be used for a pump house.

The laying-down of new exhausters and the construction of a new exhauster house is the first step towards the re-arrangement of all the dry purification plant. It is proposed, as will be seen from the accompanying drawing, to bring all this plant under cover and at the same time considerably to increase the capacity of the plant. In the present arrangement of plant there are two Livesey washers, two tower scrubbers, and two rotary washers, the gas passing through these pieces of apparatus in tandem. This arrangement gives the plant a maximum capacity of 1½ million c.ft. per day.

In the new arrangement it is proposed to bring all this plant inside the old retort house, and alongside the new exhauster house. The plant will be put down in two separate lines, both being connected to a common main. Each line will consist of a Livesey washer, tower scrubber, and rotary washer. The amount of gas passing through each section will be controlled by a valve and gauges. This arrangement, while adding no new purifying plant to the works, will increase the capacity of the plant to 2 million c.ft. per day, or an increase of ½ million c.ft. The only new apparatus necessary would be one bed of 5-ton vertical retorts to act as stand-by plant, and the addition of further atmospheric condensers.

"Unit" Method of Layout.

The works will then be so arranged as to allow for the extension of plant necessary to increase the capacity of the auxiliary units to 4 millions per day. As shown, this further addition would take place on the opposite side of the exhauster house, and would be in every way a duplicate of the first two lines of plant. The "unit" method of layout is definitely designed with a view to providing simplicity in working and maximum efficiency during varying loads. The Company's winter output of gas is double that of its summer load, and by this method of design it will be possible to lay off units of plant to suit the output of gas. For a considerable number of years, when installing new plant, earnest consideration was paid to its position, in order that it would form part of the ultimate "unit" scheme.

To increase the capacity of the carbonizing plant to 4 million c.ft. per day, another 3 beds of 5-ton retorts would be added, and, as will be seen from the drawing, there is ample room on the existing site.

For an installation of 4 million c.ft. per day the coal plant would require to be extended, and this would be done by an additional plant, of the same type as the existing one, placed at the opposite side of the auxiliary coal hopper.

With the extension of carbonizing plant to the 4-million stage, the question of steam generation has to be considered, and the arrangement shows an addition of two 30 ft. by 9 ft. Lancashire boilers put down on the opposite side of the existing boiler chimney. In connection with the generation of steam, waste-heat recovery plant would be incorporated in the vertical retort extensions. This would take the form of induced-draught boilers of the latest type.

Two water-tube condensers of a capacity of 2 million c.ft. per day would be put down at the back of the new boilers, and the cooling water would be used in the boilers.

For a 4-million works the dry purification plant would have to be extended, and this would be done, as shown, by the addition of another set of four 30 ft. by 30 ft. boxes. A new station meter would also have to be installed, and this has been provided for, as will be seen in the drawing.

There is at present existing a Humphreys & Glasgow blue water-gas plant of a capacity of 400,000 c.ft. per day. With the addition of a carburettor the capacity would be increased to 500,000 c.ft.; and this has been allowed for. There is also on the same site ample room for another installation of the same capacity.

In the arrangements shown the great advantage of the whole layout lies in the fact that all plant is duplicated and can be worked either in one or in separate units.

Action of Chlorine on Coal

A recent investigation on this subject has been undertaken by A. Eccles and A. McCulloch, of the College of Technology, Manchester; and the results of their work have been published in the "Journal of the Society of Chemical Industry" (Sept. 19 and Sept. 26).

Previous studies of the action of the halogens on coal have been directed mainly to tracing a relationship with that of oxygen; and in general it has been found that the greater the reactivity of the coal to chlorine, the greater is its liability to oxidize and spontaneously ignite.

The authors capitulate the course of the reaction between coal and chlorine. When chlorine is brought into contact with coal, hydrogen chloride is evolved, one volume of hydrogen chloride being produced for one volume of chlorine taken up by the coal through substitution. A further quantity of chlorine reacts with the coal through addition. The coal, however, absorbs chlorine in excess of that accounted for above, owing to its adsorptive capacity. Hydrogen chloride produced by reaction is also adsorbed by the coal. A study of the action of chlorine on coal such as is detailed by the authors thus takes account not only of the chlorine absorbed by the coal by the processes of substitution and addition, but also of the adsorption of the chlorine and the hydrogen chloride by the solid material. The solid material will, naturally, vary in character throughout the course of the reaction, from original coal to a product which will be partially or completely chlorinated, dependent on the conditions obtaining at any specific moment of the period during which chlorination is allowed to proceed.

An apparatus is then described in which the absorption of chlorine by coal and the evolution of hydrogen chloride may be studied under standard experimental conditions. The results of the investigation are briefly as follows:

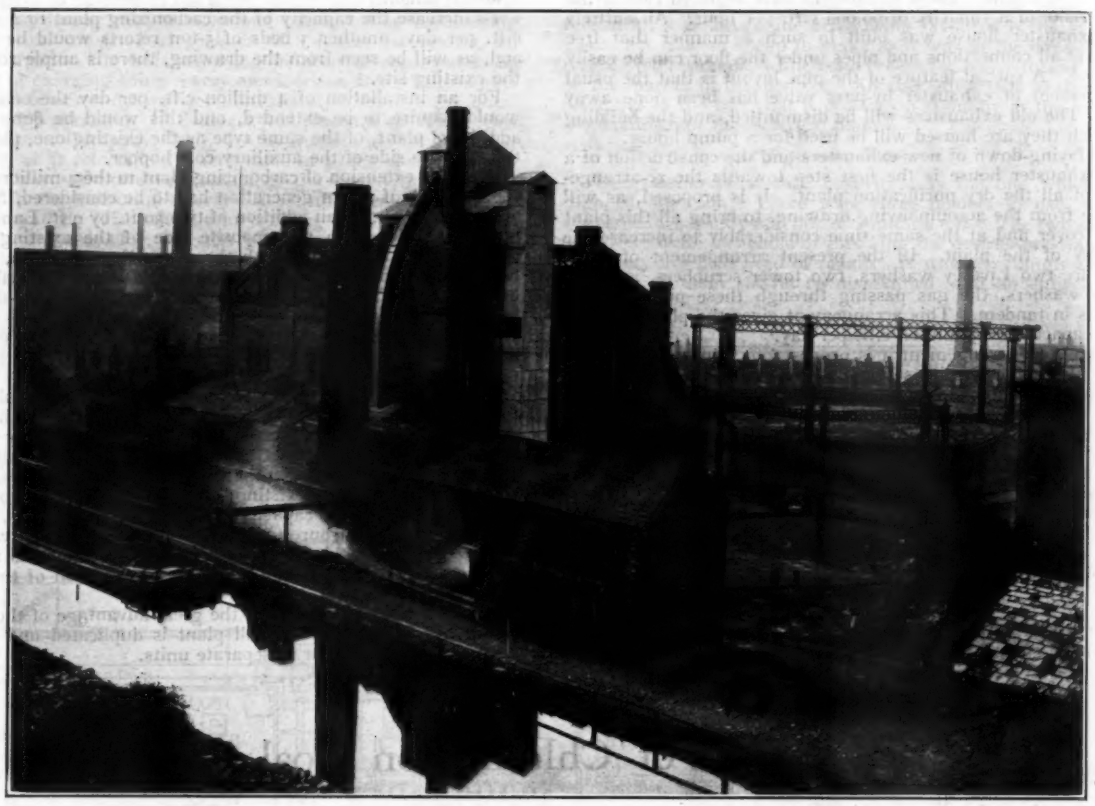
Absorption of chlorine by the coal is rapid in the early stages, and is followed by a long-continued and slow absorption until, if conditions permit, equilibrium is attained between the free chlorine in the atmosphere over the coal, the hydrogen chloride produced by chlorination, and the coal. The initial rate of absorption of chlorine is influenced by the temperature at which reaction is allowed to proceed, the pressure of the chlorine, and the fineness of division of the coal. The influence of these factors on the rate of absorption in the later stages is not so strongly marked, the curves representing absorption over these periods tending to become approximately parallel. Temperature, pressure, and fineness of division influence the amount of hydrogen chloride liberated by the coal under a given set of experimental conditions. An increase in the pressure and the temperature at which the reaction proceeds, and in the fineness of division of the coal, result in an increased amount of hydrogen chloride. Hydrogen chloride is rapidly evolved during the early stages of the reaction, after which evolution becomes comparatively slow. Placing the chlorinated coal under reduced pressures results in the evolution of further quantities of hydrogen chloride. From atmospheric pressures to pressures in the region of 100 mm. of mercury the rate of evolution is comparatively slow, but below the latter pressure evolution is rapid.

Chlorinated coal partially freed from hydrogen chloride by evacuation will re-absorb a large amount of chlorine. The absorption is very rapid over a short initial period, after which absorption ceases. Re-chlorinated coal after evacuation again absorbs chlorine in the same manner, and practically to an equal extent to the chlorinated coal after evacuation. A small amount of hydrogen chloride is produced during re-chlorination. Re-chlorinated coal rapidly loses hydrogen chloride at a reduced pressure approximately equal to that at which hydrogen chloride is evolved freely by the chlorinated coal.

Further experiments are being made in view of the considerations which follow: The term "unsaturated" has been very loosely applied to coal as indicating its property of rapidly absorbing oxygen or a halogen. No differentiation, however, has hitherto been made clearly between the unsaturated nature of coal in a true chemical sense which would result in an addition product, and the incorrect use of unsaturated, on the other hand, as inclusive of the oxygen, with which the coal would react to produce other substances such as water through substitution. When chlorine reacts with coal a certain quantity of the chlorine is absorbed by the coal owing to addition, a further quantity is absorbed with the production of hydrogen chloride owing to substitution, and a still further quantity is adsorbed. The authors observe that it would thus appear possible to determine, by methods similar to those described in their paper, the relative quantities of chlorine used, and in this manner clearly to distinguish the true "unsaturatedness" of a coal from its property of combining with reagents through substitution and addition.

Shipley Inaugurates New Carbonizing Plant

On Wednesday last a Woodall-Duckham Installation of Continuous Vertical Retorts was officially opened at the Shipley Gas-Works.



GENERAL VIEW OF THE WORKS.

The need for new carbonizing plant at the Shipley Gas-Works has been manifest for the past twelve years, and from the appointment of the present Engineer and Manager (Mr. H. Burton) in September, 1918, has been under the consideration of the Gas Committee. Having in mind the heavy capital commitments of the undertaking, it was considered advisable to work the old and unsatisfactory plant as long as possible, with the object of deferring the necessary addition to the capital account.

After a close study of modern systems of carbonization, it was decided to dismantle some of the existing inclined retorts and install a battery of Woodall-Duckham continuous vertical retorts in their place. The economy of ground space occupied by the new plant is one of its outstanding features. In addition, the new plant will assist materially in preserving a cleaner atmosphere, for it is smokeless in operation. Further, since it produces a superior smokeless fuel in the form of graded coke, it will enable both the industrial and domestic consumers to assist in the community's endeavours towards smoke abatement.

The Shipley Undertaking.

In 1847 the "Shipley Gas Light Company" was incorporated. The Company continued until the purchase by the Council in 1899. The total amount borrowed to meet the purchase price and other payments upon the acquisition of the undertaking was £245,990. In 1901 an additional £25,000 was borrowed for the improvement and extension of the works; while in 1903, £33,831 had to be paid for the undertaking of Sir Titus Salt, Sons, & Co., Ltd., of Saltaire. To-day the outstanding debt is £141,204. The reduction in the debt upon the undertaking to less than half the original amount represents an enormous strain upon the finance of the concern over the past thirty years. The interest and sinking fund charges per annum amount to about 2s. per 1000 c.ft. of gas sold.

In the first year, 1901-2, there were 6696 consumers (meters in use), taking 155 million c.ft. of gas. In 1928 there were 11,105 consumers taking 200 million c.ft. of gas.

Gas Manufacturing Plant.

The carbonizing plant prior to the installation of the new continuous vertical retorts consisted of two parallel benches of inclined retorts. The first bench of 40 retorts was installed in 1902 by Messrs. Jenkins, Ltd., of Retford, and the second of 48 retorts in 1904 by Messrs. Drakes, Ltd., of Halifax. The total capacity of this carbonizing plant was 1,100,000 c.ft. of gas per 24 hours. As a preliminary to the present scheme, it was necessary to provide additional gas-making plant to enable the supply to be maintained during the period of dismantling a portion of the old retort bench, and the construction of new. A carburetted water gas plant, by Davison & Partner, of a daily capacity of 500,000 c.ft., was therefore installed.

The carbonizing plant superseded by the new installation comprised four beds of eight inclined retorts 20 ft. long, being part of the bench of six beds, the remaining two beds being reconnected and made ready for use if needed. The new plant, of a total capacity of 1,160,000 c.ft. per day, occupies exactly one-quarter of the retort house, which housed an inclined retort plant of a similar capacity.

The New Installation of "W.-D." Verticals

The installation consists of one bench containing 12 retorts heated by means of two producers placed at the ground-floor level at one end of the bench.

Coal is fed into a 10-ton receiving hopper at yard level from carts, canal barge, or store. Thence it is passed by a jigging feeder into a 25-ton per hour cased-in bucket elevator which delivers the coal at a height of 90 ft. to an Avery weigher, and thence to a push-plate conveyor above the overhead storage hoppers of the retort bench.

Each retort is about 25 ft. high and of rectangular tapered shape, being 62 in. by 10 in. at the top. The design of the setting is in accordance with the latest practice of the Woodall-Duckham system.

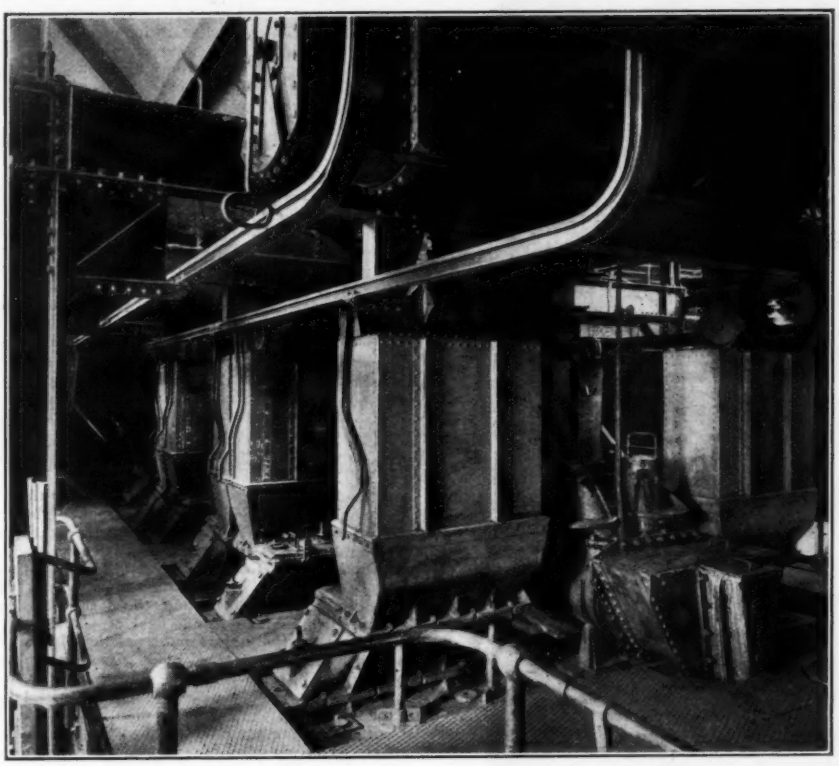
For utilizing the major portion of the heat content of the

waste gases after they leave the retort bench a waste-heat boiler is installed. The boiler, which is of special design, is of the horizontal, multi-tubular, fire-tube type, suitable for a working pressure of 150 lbs. sq. in.

Fixed coke screens are arranged above a battery of outside reinforced concrete coke storage hoppers. The screens are arranged to separate small coke under 2 in. size from the large coke, the two sizes falling into the respective compartments of the storage hoppers. In case the stock of coke exceeds the capacity of these concrete hoppers, provision is made by means of an additional chute and door whereby the existing telpher can empty the hopper and deliver the coke to the stocking yard or the original coke hoppers.

The compartment for small coke is fitted with two chutes and ¾-in. screens, one for delivering coke nuts to carts and one for filling sacks on a sacking platform, the breeze being collected in a small hopper arranged underneath the screens and fitted with a quadrant door for feeding into vehicles.

The coal elevator is electrically driven, and in order to provide a stand-by supply of electricity in case of failure of the town supply, an existing gas-engine has been re-conditioned and coupled by belt drive to a new alternator; the whole, with the necessary switchboard, being arranged in a power house constructed from the old boiler house.



TOP CHARGING PLATFORM.

Steam engine drives are supplied for operating the coke extractors, lift, boiler feed, and liquor circulating pumps. Duplicated stand-by engines are provided for the extractors and liquor pump. The whole of the steam is provided by the waste-heat boiler, and sufficient surplus steam is available to run the rest of the works engines.

Inauguration Ceremony.

Welcoming the visitors, Mr. A. W. Robson, Chairman of the Shipley Gas Committee, said that all who familiarized themselves with the history of the Shipley Gas Undertaking would agree that the provision of new plant had become highly necessary. Indeed, the need for new plant was obvious even before the present Engineer and Manager had taken charge twelve years ago; but financial conditions of the times were such that the Council had had to wait until it was in a position to spend the money required for a new installation. In the meantime, the Engineer and staff had been working for years under great difficulties—not only difficulties, but actual dangers, as had been evidenced by an occasion on which the end of one of the old inclined retorts had dropped off and had been carried away by the coke conveyor! The war period had been a difficult time for all gas undertakings, but particularly so at Shipley, where the plant was much the worse for wear. Yet, by perseverance and enthusiasm, the staff had managed to maintain the gas service, under a very great handicap, and at the same time had enabled the Council to go a very long way towards wiping out the old heavy burden of debt. Since the Council acquired the works from a Company thirty years ago there had been all the time a serious financial drain, but of the £310,000 original capital debt, over £200,000 had been redeemed. The Shipley Urban District Council had no doubts about the future of the gas industry. They had every confidence in it, despite the growth of electrical competition.

Luncheon Speeches.

Following the works inspection the party gathered at luncheon, as the guests of Messrs. Woodall-Duckham, at the Victoria Institute, Saltaire. Mr. T. J. Gray, J.P., Chairman of the Shipley Urban District Council, presided, and was supported by Sir Arthur Duckham, G.B.E., K.C.B., M.Inst.C.E.

Alderman George Walker (Chairman of the Bradford Corporation Gas Committee), proposing a toast to the Shipley Council, said that Shipley people might regret the large amount of money they had had to pay in redemption of the debt on their gas-works, but they might find a measure of consolation in the fact that their total public debt was only about £23 per head of the population (of which £15 was in respect of trading departments), as compared with the £60 per head total debt of their larger neighbour, Bradford.

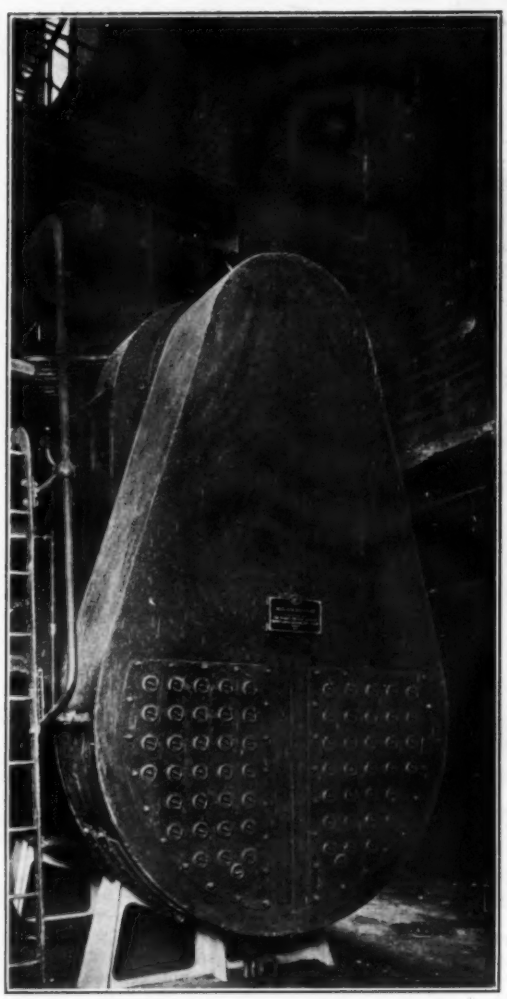
Councillor T. J. Gray, responding on behalf of the Shipley Council, said he believed that that day they had inaugurated a highly important new asset to the locality, and one which, he hoped, would go far to help local industry, both in these times of grievous industrial depression and in the days of greater prosperity which they all trusted were not very far distant. ("Hear, hear.") One of the most vital factors of to-day was the maintenance of harmony and co-operation between employers and employed. It was a co-operation which meant mutual confidence; and he believed the gas industry was notable in this direction.

Shipley's Burden of Debt.

Mr. W. B. McLusky, Engineer and General Manager to the Halifax Corporation Gas Department, proposed the toast to the Shipley Gas Department, and asked to be forgiven if he expressed a few candid—and, he hoped, helpful—criticisms, particularly on the financial aspect of gas supply at Shipley. Undoubtedly the greatest difficulty under which the Shipley Gas Undertaking had laboured was its capital debt. The amount of money required for the manufacture of gas last year, he found, was only £26,724 in round figures, which amounted to 2s. 9d. per 1000 c.ft. of gas sold. If the burden of debt on the undertaking had been moderate the price of gas would

have been 9d. per therm, or 3s. 9d. per 1000 c.ft., or less. The average price received from all sources had been 4s. 11·60d.—2s. 9·06d. for gas and 2s. 2·54d. for distribution and interest and sinking fund charges. A big proportion of this was in payment of debt. Coal was still comparatively dear, there having been slight advances in recent years. Receipts from residual products were still low—lower, in several instances, than pre-war. If coal could be purchased at pre-war prices and if residual products commanded pre-war figures, the net cost of coal *less* residual receipts in Shipley to-day would not be more than £1000. But the actual net cost of coal *less* residual receipts last year had been £5700. The difference between those two figures represented not less than 7d. per 1000 c.ft. of gas sold.

Nevertheless, remarked Mr. McLusky, if that were the only handicap in Shipley they would soon overcome it with the new plant they had just installed—a plant which would not only reduce the quantity of coal required but would improve the quality of the gas and the residual products. Unfortunately, there was still this great burden of debt on the old plant. "You paid too much for your gas-works," said the speaker; "and the method adopted for the repayment of the loans was wrong—it was wrong then and is wrong to-day. A debt



Waste Heat Boiler Installation.

of this kind should be redeemed in the old-fashioned way by the payment of a yearly instalment—a 25th or a 30th of the whole, as the case may be—and interest on what is left. By this means the burden diminishes as the years go by, and the consumer feels the benefit in a constantly falling price." New plant, proceeded Mr. McLusky, needed but little expenditure on repairs during the first ten years of its life; these were the years during which the major portion of the capital cost should be wiped off. But under the annuity system of redemption of debt they never got forward until the last day. The old Shipley Gas Company in the year 1870 was receiving 3s. 6d. for gas. They were spending 1s. 10d. of that on manufacture and distribution, and 1s. 8d. on dividend. That was thirty years before the transfer to the Council. Thirty years ago, at the date of the transfer, the Company was selling gas at 3s. 1d., of which 2s. 1d. was spent on manufacture and distribution, and 1s. on dividend. The price paid for the undertaking was £245,990—to his mind a very big figure for an undertaking with an output of 153 million c.ft. To redeem this amount in thirty equal yearly instalments, *plus* interest on the amount outstanding each year, £8200 each year would have been required for sinking fund, and possibly £9225 for the first year's interest—a total of £17,425 for the first year, or 2s. 3d. per 1000 c.ft. of gas sold. The undertaking was never worth the money, and no rebates were secured for defects which the Council discovered later.

A Tribute to the Manager and Staff.

Then followed expenditure on mains and plant—£30,200; £33,831; and £49,642, a total of £113,673, which had to be added to what had already been paid as purchase price. This additional expenditure, he agreed, was necessary, but not for growth alone, for the growth had been small compared with the expenditure. Obviously part of the expenditure was necessary to maintain the business, and the purchase price should have been reduced by the amount necessary to provide for such work. This meant that the management and work of the Shipley gas undertaking had been very hard-going for all concerned. Yet, in spite of every handicap, by grit and good management—("hear, hear")—they had worked wonders. Personally, he did not envy any man who had worked on the Shipley plant in recent years; and warm tribute was due to Mr. Burton and his colleagues for the manner in which they had carried on and maintained an unbroken service. ("Hear, hear.") In spite of every handicap they had stuck to their job, and the total outstanding debt on the undertaking to-day was only £141,204. By the process of repayment adopted—a process which, no doubt, was forced on them by circumstances at the time—the amount still required year by year to meet interest and sinking fund charges was very high, and out of all proportion to the amount of debt unredeemed. Last year they had paid £19,940 for interest and sinking fund charges—a figure which represented over 2s. on every 1000 c.ft. of gas sold. A debt of £141,000 should certainly not require such a burden of interest and sinking fund. A gas undertaking with a debt of that dimension would be doing its duty to the ratepayers by paying off a twenty-fifth of that amount yearly, and interest on the remainder. By this process of redemption the contribution to the sinking fund would be £5648 every year for twenty-five years, and the item for interest would be less than £7000—a total of £12,648 for the first year, diminishing year by year over the twenty-five years, or £7000 less than was actually having to be paid. This process would reduce the item of 2s. per 1000 c.ft. for interest and sinking fund to 1s. 4d. per 1000 c.ft. This was the way to give the gas customers and the ratepayers of Shipley the benefit of their new gas plant. The new and most efficient plant and their highly efficient Engineer's best efforts were being wasted if they did not bring their commodity within the reach of even the smallest consumer; and this could only be done by reducing the price of gas. The average consumption of gas per consumer per annum at Shipley was only 17,280 c.ft., and the average consumption per inhabitant was only 5240 c.ft. If they could, by reducing the price, bring the consumption per inhabitant up to 10,480 c.ft. per annum (double the present figure), and adopt the process of debt redemption which he (Mr. McLusky) had outlined, the incidence of the interest and sinking fund charges would fall to 8d. per 1000 c.ft., as compared with the 2s. to-day. This would bring the price of gas down to 3s. 8d. per 1000 c.ft. without taking into account the economies to be effected by the new plant, which would be very considerable.

"An Excellent Plant."

Councillor A. W. Robson, replying to the toast as Chairman of the Shipley Gas Committee, said they greatly appreciated the close inquiry which Mr. McLusky had made into the position of the Shipley Undertaking and the excellent advice he had given them not only on that inaugural occasion, but in their own early inquiries into the type of plant most likely to meet their needs. Mr. McLusky's Works at Halifax had been among those they had visited; and they had received from him a great deal of sound counsel. Mr. McLusky's criticisms of the unfortunate position in which Shipley had been placed by its old purchase made him (Mr. Robson) feel that they had been fully justified in what they had now done in installing this new and thoroughly modern plant; justified both in the matter of expense and in the choice of plant. ("Hear, hear.") The Shipley Committee were perfectly satisfied that they had now got an excellent plant. The question of ground space had been an important consideration. The new vertical plant took up just about one-quarter of the space which would have been required for plant on the old system, and a repetition of the former system would have necessitated taking out about half the existing plant—which was needed to maintain the gas service—during the installation of the new. It had been a very hard job to maintain a gas service during the past twelve years, and there had been all along an ever-present risk of not being able to keep the service going.

Friendship between Employers and Employed.

Mr. Gordon Waddilove (Deputy-Chairman of the Shipley Gas Committee), proposing a toast to the Contractors, remarked that the whole gas industry owed great tribute to Sir Arthur Duckham for his service to the industry, for his great work on the Sankey Coal Commission, and for his work on the Australian Commission. They in Shipley owed him and his firm a tribute for giving them a plant which, they were confident, would go far to get them out of the handicapped position under which they had been working hitherto. They particularly appreciated the fact that a busy man like Sir Arthur had found time to be with them on that occasion. Sir Arthur Duckham was a man who recognized that not only the management, but the workmen, had a big part in the success of any undertaking; and while he and his firm were entertaining that gathering there to-day, Sir Arthur had asked that the workmen should not be forgotten and that they also should be given a "good do like we are having now." (Applause.) This, suggested Mr. Waddilove, indicated the fine spirit which permeated the gas industry and which helped it to prosper despite the fierce competition which it had to face. (Applause.)

Sir Arthur Duckham, responding, said that he was amply satisfied

with the plant. The great thing in designing that plant, which he had first invented in 1903, was to have one which would work automatically, would give better conditions for the workmen, cleaner conditions on the works, economy in working, and make the best possible use of the coal. The plant as conceived in 1903 had, of course, been improved since then, and to-day at Shipley they had seen the very latest in operation. He felt sure all who had inspected the plant and had seen anything of the old plant at Shipley would realize that the workmen would never have the slightest wish to go back to the old inclined retorts and the class of labour which they had involved. ("Hear, hear.") The men, perhaps, were required to exercise a little more intelligence in the working of the new type of plant; but industry to-day recognized that the workers had a share and an interest in their work, and deserved proper tribute to their intelligent part in it, and should have every encouragement in that direction. ("Hear, hear."). They had heard that the new plant had proved a great success. This was due to two parties in particular—to Mr. Harry Burton, the Shipley Gas Engineer and Manager, who had watched and studied the plant under construction and subsequently under working; and to the workers, whose co-operation had been very willing and without whose enthusiasm they could not run a plant so smoothly and efficiently. ("Hear, hear.") In Mr. Burton Shipley had a man who was gradually drawing the town's gas undertaking out of a very unhappy position. The Shipley Gas Committee had not asked for a guarantee test of the new plant by the contractors. They preferred a test by themselves under ordinary working conditions, and he thought they had adopted a wise policy. They had made their test; and they had found the plant entirely to their satisfaction. He (Sir Arthur) hoped the Committee would express to the workmen the contractors' own warm appreciation of their co-operation.

COUNCILLORS AND GUESTS AT THE OPENING CEREMONY.

Mr. Victor Waddilove, Chairman of the Shipley Health Committee, proposed a toast to "The Visitors."

"W.-D." Verticals for Small Works.

Mr. E. H. Hudson, Engineer and Manager to the Normanton Gas Company, responding, said the visitors were all very glad to be there that day to give a little support and encouragement to a neighbour, and particularly a neighbour who had passed through such trying times in the production of gas as had Shipley previous to the installation of the new plant. The widespread willingness to render support and help between one undertaking and another was outstanding in the gas industry. ("Hear, hear.") The new plant at Shipley was no experiment. It had been tried, and found to meet all that was claimed for it. As far back as 1914 he (Mr. Hudson) happened to be what they might now regard as one of the earlier experimenters in the application of the Woodall-Duckham vertical retort plant to a small gas-works. It had previously been generally declared that this new type of plant was suitable only for large works. He had it installed at Normanton, and he believed that was one of the smallest installations up to that time. It was distinctly an experiment, but it proved its value amply. The foundations of the plant at Normanton had been laid on the day war was declared, and he was quite convinced that, but for that installation, owing to the tremendous withdrawal of labour for military service, they would never have been able to keep Normanton supplied with gas throughout the war years. Since his undertaking ranked among the companies which had done well in the gas industry, he wished to say he attributed that success entirely to the Woodall-Duckham plant they had at their works. Mr. Hudson, concluding, said he was sorry to see that the name of one man who had had the bulk of the burden of anxiety as to the maintenance of supply by the old plant and the natural anxiety as to what would be the behaviour of the new plant was not down on the programme of that day's toast list; and he wished to propose a toast to Mr. Harry Burton, the Shipley Gas Engineer and Manager.

Mr. Burton, responding to the toast to himself—which was drunk by the gathering with warm enthusiasm—thanked his brother engineers and members of Gas Committee for their presence and their encouragement. They at Shipley had had many anxious hours in handling the old plant, but they hoped and believed, despite the more technical character of the new installation, that the Committee, the Engineer, and the staff and workmen were going to have much happier working days in the future.

MARPLE'S NEW WATERLESS HOLDER.

Inauguration of a Quarter-Million Holder at the Ludworth Works.

On Wednesday last a formal inspection was made by the Council of a new ¼-million waterless gasholder, erected at their Ludworth Works, and practically the whole of the Council ascended the staircases, entered the gasholder, and descended to the piston. A lady Councillor, Mrs. Wise, also joined the party inside the gasholder, where a careful inspection was made of the sealing arrangement, in which all present were particularly interested.

Afterwards they retired for light refreshments, and at this function Councillor Tomlinson, the Chairman of the Council, and several other members made pleasing references to the holder generally, and the way in which the whole of the contract had been carried out.

Councillor J. Smith has been Chairman of the Gas Committee for upwards of twenty years, and he, together with the Engineer, Mr. J. K. Law, was complimented on the way the work had been designed and carried out.

Another interesting reference was made by one of the speakers, who stated that already 226 holders of the waterless type were now in operation, and that orders for upwards of thirty had been placed with the British Licencees during the last three years.

We understand that the new site for the extensions, acquired and scheduled in 1924, is being excavated and filled up as necessary to give the desired levels and falls for drainage, access to works, &c. The new boundary walls, completed by Mr. Griffiths, Contractor, Mellor, are built on concrete foundations throughout, with battered rubble walls on which are built brick walls, relieved and strengthened by piers, and stepped up as necessary to suit the finished levels of the site. Accommodation is available on this land for further extensions of plant when necessitated by the increasing business of the Department.

The acquisition of the site was rendered urgent by reason of insufficient gas storage With the continued and rapid increase in gas output during past years, extensions have been proceeding in all parts of the manufacturing and distributing plant with the exception of the storage, which should be equal to 24 hours, or at least 22 hours maximum production of gas, whereas its ratio to that standard had fallen to about one-third. No increase in storage had been provided since 1905, when the 24-hour maximum make of gas was 88,000 c.ft.; and work has been carried on under increasing outputs until the 24 hours' make of gas reached a maximum figure (in February, 1929) of 360,700 c.ft., when, with the heavy demands occasioned by the severe frost, the holder was deflated and the gas supply was only continued at low pressures, from the manufacturing plant direct to the district, with consequent inconvenience to the gas consumers, especially in the lower areas.

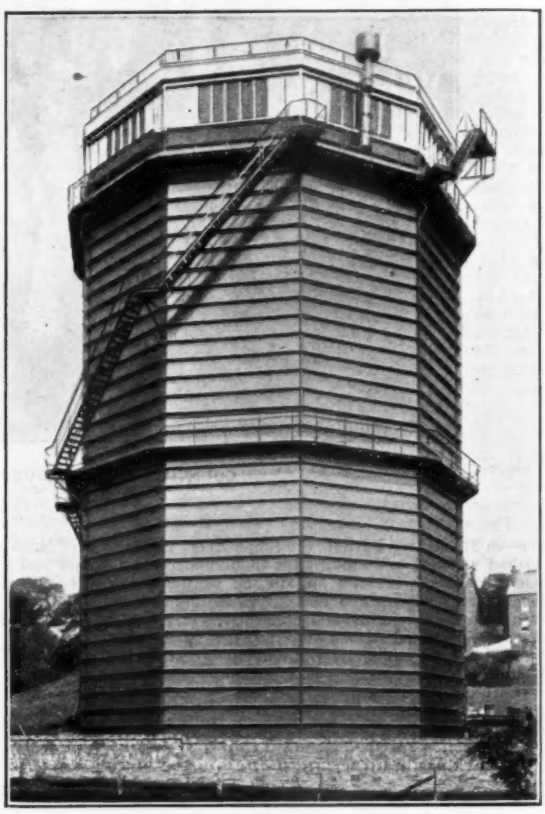
After considering very fully all the various types and designs of gasholders, the two more modern types were selected for final comparison—namely, the spiral-guided and the waterless types. Drawings, details, specifications, &c., were prepared for a spiral-guided holder, and tenders were invited for this and alternatively for a waterless holder of equal capacity. When considered in conjunction with the cost of foundations, which is much less with the waterless type, the total costs of the two were sufficiently near to reduce consideration of the question to a comparison of the structural and other advantages; and the waterless holder was finally adopted for the following reasons:

1. Less ground space required.
2. Longer life of structure, due to the perpetual coating of the interior with tar and the absence of water in which the floating holders are constantly rising and falling.
3. Freedom from danger and damage due to frost.
4. Less danger in stormy weather, being more rigid in construction and working.
5. Accessibility inside and out for inspection and repairs.
6. Pressure of gas practically constant at all volumes.
7. Dryness of gas beneficial in regard to water and naphthalene on the district.
8. More speedy erection.
9. Less weight on foundations.
10. In appearance the waterless holder is much more attractive, and, by reason of its freedom from the disadvantages of constant immersion, it offers more opportunities for decorative effect.

It is significant that the hostile criticism in the immediate neighbourhood of the works, which is always in circulation when a gasholder is in course of erection, has died away since the structure has been completed and painted. Due regard has been paid in painting to the necessity of preserving the amenities of the district as far as possible. The holder stands out against a background of pasture-land and trees, and the colours selected, therefore, were foliage green for the plates, russet brown for the staircases and landings, and aluminium paint, which, applied to the upper portion, assists in reducing the apparent height.

The contract for the supply, delivery, and erection has been completed by Messrs. R. & J. Dempster, Ltd., of Manchester, in a sound and workmanlike manner, and during the whole period of erection the progress has been steady and without setbacks or delays of any kind.

In regard to the tar circulation, no electric current being available, and the installation of a separate generating set for a holder of this size being deemed too expensive, steam pumps were substituted, provided with special controlling arrangements for instant action as the tar float automatically rises and falls. Any tar passing the slipper plate of the seal proper creeps down the sides of the holder into a tar dam at the base, and from this dam the tar passes into a tar sump in which is



fitted a control float to operate the mechanism at the steam pump. As the float rises to a pre-determined position it automatically operates the switch gear, sets the pump in action, and closes the steam control as the float settles back to rest.

The holder dimensions are 62 ft. 4 in. diameter by 100 ft. 5 in. high, the total working capacity being 250,000 c.ft. The actual volume of gas in the holder can be read at a glance by means of a special indicator on the outside, which is graduated in intervals of 5000 c.ft.

Systematic tests were carried out during construction, to prove the structure gas-tight, resistance to piston movement, &c., and again upon completion the holder was filled with air and emptied repeatedly while pressures, levels, roller adjustments, and seal depths of the piston were recorded. Finally, the holder was left standing for a period of ten days filled with air, during which time pump runs, readings of volume, temperature, and pressure were periodically recorded, and corrections were made to normal figures. Meanwhile the inlet and outlet mains, 18 in. in diameter, were extended from the existing works, and connected to the new holder by the gas-works staff; and, all tests being proved to be quite satisfactory, the holder was put into operation and the gas supply turned on to the district on Nov. 3.

GLOVER-WEST VERTICALS

- - AT BIDEFORD - -

On Thursday last new Glover-West Vertical Retorts and Plant were inaugurated at the Works of the Bideford Gas and Coke Company, Ltd.

Gas first came to Bideford in 1835, when, on Oct. 29, the Bideford Gas and Coke Company was established, with a capital of £2500, though the works were not completed and opened until Feb. 15 in the following year, when gas was supplied to 136 consumers—of whom 30 paid by the quarter, 58 by the meter, and 48 were public lights—at 12s. 6d. per 1000 c.ft. In 1837 the price was reduced to 11s., and in 1847 to 7s. 6d. per 1000 c.ft. In 1851 the price was 6s. per thousand, and a dividend of 6 p.ct., free of tax, was being paid.

On Nov. 21, 1870, the Company was registered as a limited liability company under the Companies Act of 1862. In 1883 the freehold of the works was purchased, and the average dividend to 1891 had been £6 19s. 7½d.

The growth of the Company, as exhibited in the increasing make of gas, is shown in the accompanying chart.

This rapid and satisfactory growth has been met from time to time by increases in capital and plant. In 1892 the share capital was increased by £12,000 under Special Order; a 60,000 c.ft. holder was added to the 56,000 c.ft. holder of 1869, which is still in use, and new retorts, condensers, purifiers, boiler, and exhauster were installed. During 1891-92 negotiations were carried on between the Gas Company and the Town Council on the question of the purchase of the gas-works by the Council, but this came to nothing.

In 1895 a sulphate plant was installed, and in 1897 a scrubber and a new engine and exhauster.

A Provisional Order was obtained in 1909, authorizing the issue of a further £10,000 in "additional shares," and a new retort house, another holder of 200,000 c.ft. capacity, a set of four purifiers with oxide shed, and a four-column annular condenser were installed.

New Offices and Showrooms.

Prior to 1912 the clerical work of the Company was carried on at the premises of the Secretary—the position was then held by Mr. W. D. Joce—but in this year the Company purchased freehold premises on the Quay, known as "The Three Tuns." This building was demolished and new offices and showrooms were erected, opened in August, 1913, and duly registered at Somerset House. During the process of demolition some of the ancient and historical pieces of the old building were preserved; and they were used in the construction of the new premises. These include an ornamental plaster cast, together with frieze of the Coat of Arms of the Grenville family, also two good specimens of antique studded doors, and a portion of the original oak balustrade. These are objects of interest to many visitors to Devon, especially those from overseas.

In 1913 the obsolete sulphate plant was replaced by a new one, and further extensions of carbonizing plant were carried out in 1914. In 1920 further retorts were built, together with a new boiler and exhauster, and in 1925 a carburetted water-gas plant was installed.

Increasing demand for gas in 1921 led to insufficient pressure in several parts of the district, which entailed the installation of boosting plant; and when in 1928 arrangements were completed for the purchase of the Westward Ho and District Gas Company, which had an output of nearly 3 million c.ft. of gas per annum, compressing plant was installed at the Bideford Works with a new 5-in. high-pressure welded steel main. This main was taken to a high-pressure governor in duplicate on the outskirts of the new district, and thence to an 8-in. feeding main to the existing distribution system. The gasholder and works of the Westward Ho Company were demolished, and the price of gas in their district was reduced from 9s. 6d. to 5s. per 1000 c.ft.

In 1929 the undertaking of the Northam, Appledore, and District Gas Company was purchased. This Company had an output of 7½ million c.ft. per annum. A 4-in. high-pressure main was connected to the 5-in. main laid the previous year to the Westward Ho district, with duplicate governors and connections to the existing distributing mains in a similar manner to the arrangements in the case of Westward Ho. The gasholder and works were dismantled, and the price of gas in the new district was reduced from 7s. 11d. to 5s. per 1000 c.ft., with further reductions for consumptions over 5000 and 10,000 c.ft. per quarter respectively.

BIDEFORD GAS-WORKS—A VIEW FROM THE AIR.

A GENERAL VIEW OF THE GAS-WORKS.

Further increases in capital were covered by Special Orders obtained in 1926 and again in the present year. The present price of gas in Bideford is 8·6d. per therm, equivalent to 3s. 7d. per 1000 c.ft.

Glover-West Vertical Retorts.

The installation of Glover-West vertical retorts inaugurated last Thursday consists of eight retorts of the 40-in. new model, arranged in units of two retorts in each of four sets of combustion chambers, two each of which are served by each of two fuel-gas producers.

The retort bench is designed for an output of 620,000 c.ft. of gas per diem, at a calorific value of 480 B.Th.U., and a yield of 83 therms per ton; and these figures have proved to be well within the capacity of the plant.

The retort house, which is of the usual brick-panelled steel-framed type, is built up from a new reinforced concrete retaining wall on three sides, the fourth side being built up from the coal-store gable so that the retort house floor coincides in level with that of the coal store. The building is of sufficient size to accommodate a further four retorts, and the coal and coke handling plants have been designed with the same object in view.

Coal to the installation is supplied direct from the coal store into the mouth of a West's single-roll coal breaker, by which it is reduced to the size convenient to the carbonizing plant. The broken coal is directed into the buckets of a West's lip-bucket conveyor, which elevates and discharges it into the overhead coal-storage bunkers above the retort bench. Chutes are provided, also, so that the small coal can be passed direct from the store to the conveyor without passing through the breaker.

Auxiliary Plant.

Coke from the retorts is discharged from the cast-iron coke chambers underneath the retort bench at intervals of approximately two hours into coke barrows, for transport either to the storage area in the yard or to the overhead coke-storage hopper for producer and retort feed by way of the lip-bucket conveyor, the coke being directed into the conveyor buckets by means of the coal by-pass chute.

The coke-extractor mechanism is actuated by a vertical steam engine, with the steam engine which drives the lip-bucket conveyor to act as stand-by if required.

Gas pressure on the retort bench is controlled by a Cowan retort house governor, and the carbonizing plant is liberally equipped with pressure gauges and recorders. Steam to the retorts is adjusted by West-Taylor steam-regulating valves, and the steam service is fitted with reducing valve, steam trap, thermometer, and pressure gauge. Platforms with staircases give access to all operating stages and working portions of the plant.

The condensers are of the four-column annular type, 30 ft. high by 3 ft. 6 in. external diameter, manufactured by Messrs. Willey, of Exeter, for a capacity of half-a-million c.ft. of gas per day.

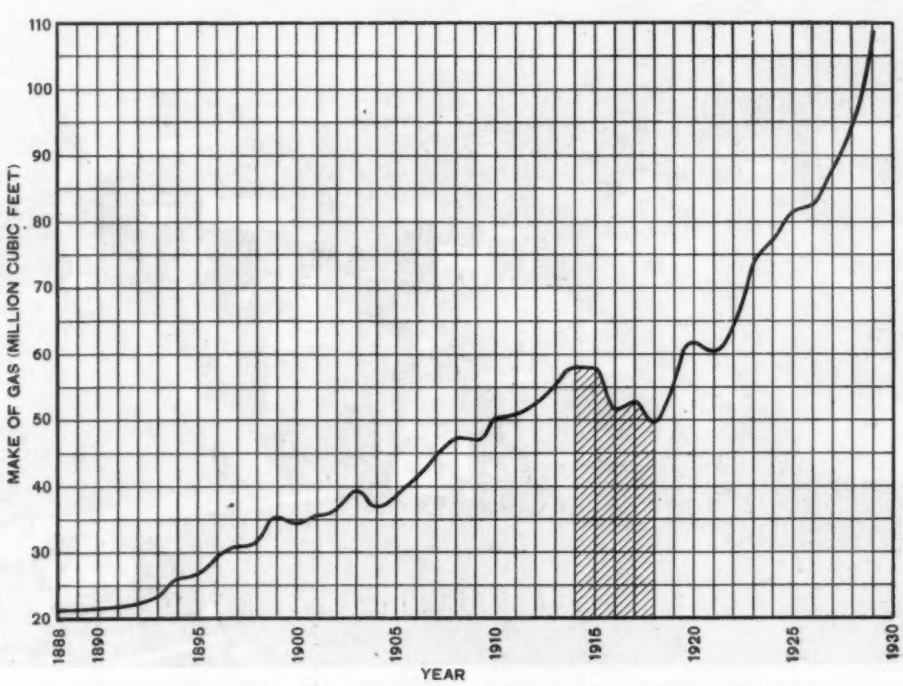


CHART SHOWING INCREASE IN ANNUAL OUTPUT OF GAS FROM 1888 TO 1929.

The exhauster plant consists of two machines, both by Messrs. Waller, of Stroud—one three-blade exhauster of a capacity of 25,000 c.ft. per hour, and one four-blade of a capacity of 30,000 c.ft. per hour, each direct-coupled to its own steam engine.

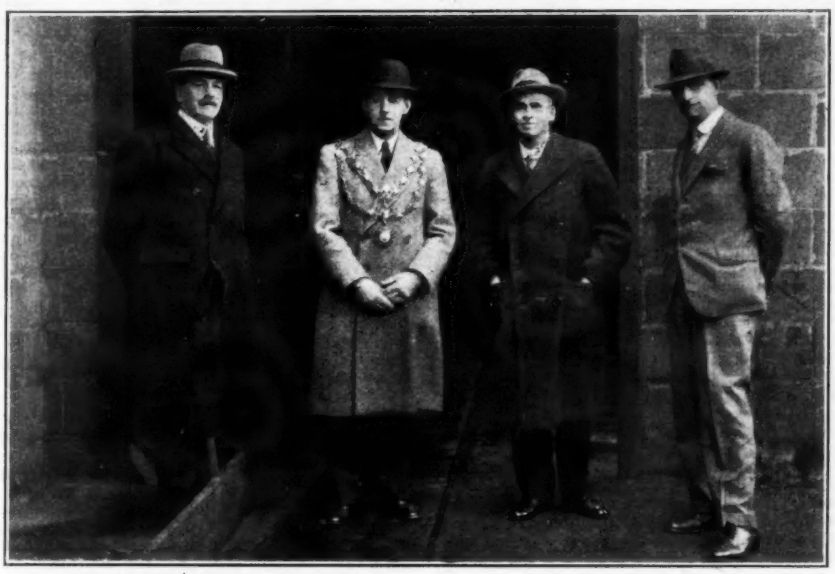
Following the exhausters is a Livesey washer, erected by Messrs. Holmes, of Huddersfield, for a capacity of half-a-million c.ft. of gas per day, a rotary scrubber of the same capacity and erected by the same firm, and a set of four purifier boxes, 16 ft. square by 5 ft. deep, by Messrs. Willey, these being of the luteless type and fitted with lifting gear. Storage is provided by three gasholders, one two-lift holder of 200,000 c.ft. capacity, one single-lift holder of a capacity of 60,000 c.ft., and one single-lift holder of a capacity of 56,000 c.ft.

The carburetted water-gas plant has a capacity of 258,000 c.ft. of gas per diem and is fitted with the back-run process. Steam is provided for this plant by a Cochrane vertical boiler of the multi-tubular type, while the rest of the works' steam requirements is met by two 20 ft. by 6 ft. 6 in. diameter Lancashire boilers, by Messrs. Danks, of Wolverhampton, fitted with Wilton's forced-draught furnaces. Provision is made on the vertical retort bench for the subsequent addition of a waste-heat boiler.

Inauguration Ceremony.

Mr. M. J. Durant, Chairman of Directors, welcoming the gathering in the new boiler house, said: I have great pleasure on behalf of the Directors of the Bideford Gas Company in offering you a cordial and hearty welcome here to our works in connection with the inauguration of our new Glover-West vertical retorts and plant. We are highly honoured and privileged by having the Mayor and Corporation and Chairman and members of Northam Urban District Council, and Mr. Ernest West and Mr. John West, and other representatives of their firm, and representatives from a number of gas undertakings in Devon and the adjoining counties.

The inspection of the works, including the new Glover-West vertical retorts and plant, the new steam-producing plant, and the new bath-rooms erected for the convenience of employees, lasted until about 12.30. Subsequently the party proceeded to the Royal Hotel for luncheon.



MR. ERNEST WEST, MR. FRANK E. WHITING (Mayor of Bideford), MR. M. J. DURANT (Chairman of the Bideford Gas Company), and MR. J. H. LOWTHER (Manager and Secretary to the Company).

LUNCHEON SPEECHES.

About seventy gentlemen attended the luncheon held at the Royal Hotel, Bideford. Mr. M. J. Durant presided; among others present being Mr. Ernest West (West's Gas Improvement Company, Ltd.), Mr. J. H. Lowther (Manager and Secretary), The Mayor of Bideford (Mr. Frank E. Whiting), the Deputy-Mayor and Director (Mr. Frederick Lee, J.P.), and Mr. A. C. Fulford (Engineer).

"Room for Both."

Mr. Ernest West, M.I.Mech.E. (West's Gas Improvement Company, Ltd.), proposing "The Bideford Gas and Coke Company, Ltd.," said: In rising to propose the toast of "The Bideford Gas and Coke Company," let me first congratulate them upon their enterprise and foresight in preparing so fully and admirably for the demand for gas in this ancient and historic borough. Probably it needs no words of mine to assure them that they are making no mistake in anticipating that there is by no means likely to be any slackening for many years to come in the increasing demand for gas, whatever may be said by our friends the electricians and their admirers. There is plenty of room for both gas and electricity. It has been pointed out more than once that the two industries flourish side by side. The classic example is that of the cities and towns of North America—the very home of cheap electricity, especially when it is generated by water power. In these cities, particularly in Canada, the consumption of electricity per head of population is three, four, and five times as much as in the great cities of our country. And yet the consumption of gas per head of population is greater in New York, Chicago, Montreal, and Toronto than it is in London, Manchester, Birmingham, and Cardiff.

And gas is likely to be in a still more favourable position in towns of the comparatively small dimensions which are found in this beautiful part of England. And for this reason—the highest efficiencies and the least cost of generation of electricity are only reached in the very large units; it takes a turbo-dynamo set of 50,000 kilowatt-hours' capacity, with the very latest in the way of steam boiler plant, to attain as much as the 25 p.ct. efficiency which is claimed for the most modern electricity power stations. But this is by no means the case with gas manufacturing apparatus. In the gas-works the maximum efficiency is attained in plant of quite modest dimensions. An installation of four or eight retorts will produce gas as economically, as efficiently, and as cheaply as a plant comprising one or two hundred units. Indeed, if anything the operations in the smaller plants are carried out with even greater efficiency than those in the larger installations, because they are more readily brought within the purview of one technically skilled man, keenly interested in his works. In other words, the efficiency of 80 p.ct., which characterizes modern carbonizing plant, is as readily realized in Bideford as in London or New York. There is, therefore, no reason why gas should not hold its own in Bideford, with the same success as is being attained elsewhere.

Turning, in conclusion, to the contract which my firm have had the honour and pleasure of carrying out for the Bideford Gas and Coke Company, may I express our appreciation of the engineering skill, the technical ability, and the courtesy and cordiality with which Mr. Lowther, Mr. Fulford, and their staffs have extended to us in the accomplishment of the work entrusted to us. They showed the greatest interest in all the problems which had to be dealt with in the execution of the work, and they have displayed no less interest in the starting-up and operation of the completed installation. We have the greatest confidence in leaving the excellent installation of Glover-West vertical retorts which you have inspected to-day in their hands, feeling sure that they will do full justice to the plant, in which we, on our part, have put the best of our engineering design and workmanship.

A Progressive Company.

Mr. Durant, responding, said: I think we can rightly claim we are a very progressive Company as you will agree when you have had time to peruse the artistic and interesting brochure issued in connection with this function. Our Company is rapidly approaching its centenary, for it was originally formed on Oct. 29, 1835, with a capital of £2500. The nominal capital on March 31 this year was: Share capital £26,620, loan £7600, making a total of £34,220, while the output of gas has grown to 108½ million c.ft. The price of gas in 1923 was 11d. per therm, or 4s. 7d. per 1000 c.ft.; the price in 1930 is 8·6d. per therm, or 3s. 7d. per 1000 c.ft.

In 1928 we purchased the undertaking of the Westward Ho! Gas Company, whose annual output was 3 million c.ft., and we straightway reduced the price of gas there from 9s. 6d. to 5s. per 1000 c.ft.; and in 1929 we also acquired the Northam and Appledore Gas Company, with an output of 8 million c.ft.; and we reduced the price of gas in this area from 7s. 11d. to 5s. per 1000 c.ft. In the above

areas two high-pressure mains were laid from the Company's works, and the gas was supplied direct to the district through governors. In consequence of these undertakings together with the increasing demand for gas in our own area new carbonizing plant was called for. We inspected and examined various types of plant, and we decided to adopt vertical retorts; the tender of West's Gas Improvement Company was accepted, and we are celebrating its installation to-day. I cannot speak too highly of the excellent workmanship, careful interest, and courtesy received by us from West's Gas Improvement Company, and I am sure my Directors will have no hesitation in recommending other companies to adopt similar installations with every confidence in the satisfactory and excellent results to be obtained. On test, the plant under normal working conditions produced 88 therms per ton of coal, against a guarantee of 78 therms.

It may be interesting for you to know that we are the largest ratepayers in the town, and that the salaries we paid last year amounted to £7846, against £4659 in 1924 (excluding labour employed by various contractors at our works). Two of our employees have recently been retired on pension with 51 and 47 years' service respectively with the Company.

Mr. FREDERICK LEE, J.P., proposing "The Visitors," said: In the history of the Bideford Gas and Coke Company this is an important occasion, and we are privileged to-day to have with us a distinguished and representative company of visitors. The inauguration of vertical retorts for the production of gas marks for us a departure from the old way, and an advance along the new. In the gas industry the new way means, not the supplanting of, but rather the dignifying of, labour. We hope to return to consumers improved value in the product, and to our shareholders the assurance that the Directors of the Company in which they have invested are alert to take every opportunity of development, and to keep the Company's plant abreast with present-day requirements. Before we ventured upon the development scheme which we are to-day inaugurating, the Directors visited the works of other progressive companies, and were greatly helped by those visits. We thank the managers for the valuable information they gave to assist us in coming to our conclusions. I am coupling with the toast the name of Mr. Dean, of Exmouth, Past-President of the Southern Association of Gas Engineers. When we visited Exmouth we were much impressed by the efficient manner in which the gas-works were maintained. There we saw machine-charged horizontal retorts—this giving us the advantage of making proper comparisons between the best possible working of horizontal with the vertical system of retorts. The efficiency of the Exmouth system almost caused us to waver, and to be drawn away from the vertical system; but in the end, after visiting other works, we came finally to the decision that, having regard to our situation, requirements, and local conditions, the Glover-West plant was the one for us to adopt.

Before I conclude, I would like to endorse your tribute of appreciation of the efficient manner in which the work of installation has been carried out, and of the satisfactory results obtained during the initial two months of the plant's working. As indicating the satisfactory position of the Company, its capital invested, after meeting this new expenditure, is well below the average capital of gas companies; and with the added prosperity to be confidently anticipated from the recent extension of our area of supply, and from to-day's modern equipment, we may look forward with ample margin for increasing capital to provide the means for further improvement and enterprise in the near future. In pre-war days, for producing a million c.ft. of gas per year, a capital sum of £500 was estimated to be a reasonable average. The Bideford Company's capital, I believe, works out at about £317—showing that the Company is in a very sound financial position. For the size of the undertaking and distance from the coalfields, we feel justifiably proud of being able to supply gas to consumers in the borough at 8$\frac{3}{4}$d. per therm equivalent to 3s. 7d. per 1000 c.ft., and at the same time maintain our dividends, showing the careful foresight and efficient management by the Board.

CREATING EMPLOYMENT.

The MAYOR OF BIDEFORD (Mr. Frank E. Whiting), responding, said: I was interested this morning in putting a question in connection with this new plant. Are you going to employ as many men? I was glad to know that it is not going to make any difference in the employment of labour, the surplus labour being absorbed in increasing activities of the Company. Generally speaking, these inventions do have a tendency to take off men; but in the long run there is no doubt, as history proves, that employment is greatly advanced by them. It is also an interesting fact that the majority of the shares of this Company are held by local residents. That is really a fine thing for the town.

Mr. J. HEYWOOD, Chairman of Northam Urban District Council, also replied.

Mr. W. E. DEAN, of Exmouth, said: I should like to congratulate the Directors on the excellent job which they have carried out. It is a first-class job. ("Hear, hear.") You have placed it in the hands of most capable men. I refer to Mr. Lowther and Mr. Fulford. [Applause.] I feel sure that your progressive spirit will be carried throughout the whole of the West of England. You made reference to your visit to Exmouth. Having seen your works this morning, I came to the conclusion that our works at Exmouth are much less efficient than yours. The time is coming when we shall have to extend; and what I have seen this morning has already made me realize what I shall want when we come to extend.

A HIGHLY EFFICIENT PLANT.

You have a plant now that is most efficient; and I feel certain you will be able to pass that efficiency on to your consumers. It is a source for congratulation that you are able to sell gas at the price you do, having regard to the cost of raw materials in the West of England and the capital expenditure you have just laid out on this new plant. The gas consumers of Bideford, Appledore, and Northam have a good deal to be congratulated upon. There are many works in the London district that are not selling gas so cheaply as you are. I think that should be brought home to your consumers. They should realize the happy position in which they are placed; I feel certain that, if they do realize this, they will increase the consumption of gas. Your progress will be much more rapid in the future than it has been in the past; and I feel sure that the new plant will do justice to the men who work it and to the consumers who use the gas.

With regard to the remarks made concerning labour, my experience is that, having put down modern plant, the tendency is to reduce the price of gas and increase the consumption, so that, instead of reducing labour, it increases it rapidly. In my own particular gas-works, when I put down the plant referred to, the general opinion was that it was going to reduce labour and that we were going to keep less men. I can assure you that to-day, after fifteen years, we are employing double the number of men we employed fifteen years ago. This is an indication that when you reduce the cost of your gas you naturally get consumers to burn more.

I have had 37 years' active interest in the gas industry, and at this moment, I am sure, we are only at the fringe of our activities. Gas has wonderful possibilities in front of it; and while we have the progressive spirit that prevails at Bideford, gas will hold its own. I congratulate you and your co-Directors on the progressive spirit you have shown in adopting this type of coal distillation.

The CHAIRMAN: We have a very excellent Manager, upon whom I should like to call to say a few words. [Applause.]

Mr. LOWTHER said: On behalf of the other members of the staff, and myself, I should like to thank you for your kind words. I do not on my part think this altogether necessary, because it is part of my duty. I should like to add my mead of tribute to West's Gas Improvement Company for the assistance they have rendered and interest they have displayed in the plant; also, I should like to thank the other engineers from the West of England for supporting the Company and myself.

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E. G. STEWART, M.Inst.Gas E.,
in the "Gas Journal," November 12, 1930.

WALTER KING, LTD., "GAS JOURNAL" OFFICES, 11, Bolt Court, Fleet Street, London, E.C.4.

Gas Display at Public Health Exhibition - -

How the South Metropolitan Gas Company are making a forceful appeal to the general public and to medical officers of health.

SOUTH METROPOLITAN GAS COMPANY'S ARRESTING DISPLAY.

Our photograph shows the stand of the South Metropolitan Gas Company at the Public Health Exhibition which is being held at the Agricultural Hall, N. The main display is devoted to smoke abatement, and particular attention is given to a demonstration, by means of "Metro" coke fires, of the uses of coke for room heating and hot water supply. The "C.B.1," an inset fire fitted with a boiler, is a unit which should find a place in every housing scheme.

The opportunity is taken to introduce the new "Metro" multi-point gas water heater. This water heater (of the closed type) is automatic in action and provides a constant and abundant supply of hot water immediately any one of the taps to which it is connected is turned on. It is attractively finished in white porcelain enamel, and altogether creates a most pleasing effect. It is an appliance that is easily installed and for this reason and because of its efficiency should quickly establish itself in popular favour.

An enterprising innovation is the exposure of hot water circulating pipes, painted in various colours, so that the observer can take in at a glance exactly what each water heating appliance is doing. It seems to us to be an admirable way of driving home the possibilities of the system.

Typical examples of "Metro" gas fires and gas cookers are also shown, and the stand is completed by the installation of a refrigerator, sterilizer, and a display of "Metro" disinfectant.

The main stand and the flank wall are lighted by "Metro" burners, and offer a fine example of the illumination that can be provided by gas and gas appliances when carefully selected and correctly applied. The exhibit is well supplied with advertising material; and the neat recesses incorporated in the structure, designed to hold the literature, are certainly something novel in the way of literature display.

NECKAR WATER SOFTENING PLANT.

On the stand of the Neckar Water Softener Company, Ltd., of 96, Victoria Street, S.W. 1, was exhibited the Neckar Natural Zeolite softening plant.

This plant comprises a substantially constructed mild steel cylinder, tested to a pressure of 100 lbs. per sq. in., unless otherwise specified. At the bottom of the plant a manifold with laterals is provided, having a series of special strainers fitted to the underside which ensure even collection of treated water from the entire area of the Zeolite bed, also even distribution of back-wash water. A shallow filter bed, composed of two grades of crushed quartzite chippings, is also situated at the bottom of the plant, for the purpose of supporting the Zeolite bed and ensuring final filtration of the water.

The Neckar Natural Zeolite is a specially selected material, of guaranteed durability and stability, and possessing rapid regenerative and exchange properties. A set of perforated pipes is situated above the Zeolite bed, and arranged to provide even distribution of salt solution over the entire area. A meter is provided on the crude water inlet, to register the quantity of water treated and rate of flow. Two pressure gauges are also fitted to the inlet and outlet connections for the purpose of registering the pressure above and below the Zeolite bed.

A further exhibit on this stand showed the firm's softening plants for domestic use. This apparatus for household use is known as the "Neckardew," and is made in five sizes and in a range of five colours—cream, french grey, pale blue, pale green, and dark blue. This apparatus has been built upon the simplest and most scientific principles of water softening, and from the very best materials.

It can be installed at any point where the water comes from the main, and passes every drop of water through a bed of a special kind of sand.

Parliamentary Intelligence.

[From Our Special Correspondents.]

House of Lords.

Special Orders.

The following Special Orders have been laid before the House and referred to the Special Orders Committee: Borough of Glastonbury, and Urban District Council of Clacton.

House of Commons.

Special Orders.

The following Special Orders have been laid on the Table of the House: Borough of Glastonbury, and Urban District Council of Clacton.

Gas Acts (1920 and 1929) Orders.

SPECIAL ORDERS.

Shrewsbury Gas Light Company.

To empower the Company to acquire additional lands, and to increase their borrowing powers.

Southgate and District Gas Company.

To authorize the granting of pensions to employees, to make further provisions as to sale of stock, and to permit of the substitution of a card index for the shareholders' address book.

Watford and St. Albans Gas Company.

To provide for the acquisition by the Company of the undertaking of the Hemel Hempsted District Gas Company.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

Despite a rather dull week in most sections of the Stock Exchange, prices of Gas Stocks and Shares continued to harden; and it will be observed from the Stock and Share List that, where comparable, stock changed hands at above the previous week's highest price in practically every instance. North Middlesex 6 p.c. consolidated stock headed the list of increases with a rise of 9 points to 115-120—a gain which is amply justified and compares with 112-117 a year ago. The Company's 10 p.c. and 7 p.c. ordinary stocks were converted into 6 p.c. consolidated stock as from Jan. 1, 1927, and since that date the Company have distributed for 1927, £6 18s., 1928, £7 1s., and 1929, £7 10s. At the current price, therefore, the yield at the latter rate is £6 7s. 9d. p.c.t. Alliance and Dublin ordinary gained 1 to 95-98; and at the local Exchange, Newcastle and Gateshead £1 units recovered the slight drop of a week ago. South Metropolitan 6 p.c.t. preference, and Gas Light 4 p.c.t. preference and 5 p.c.t. debenture, also showed increases of 1 point each.

As intimated last week, there is at the present time an abnormal demand for high-class debentures, and this is reflected in the results of recent gas issues. The enormous amount applied for in the case of the Gas Light and Coke Company's issue is fresh in mind, and the latest issue by the Eastbourne Gas Company has also been successful. The Company offered for sale by tender £60,000 5 p.c.t. debenture stock at a minimum price of 95, and applications amounted to £233,600. The average price obtained was £99 3s. 4d., and tenders ranged from £101 to the minimum, the lowest tender to receive allotment being £98 15s. Another new issue is that of the York Gas Company who are selling by tender, through Messrs. A. & W. Richards, 37, Walbrook, E.C.4, £90,000 5 p.c.t. redeemable debenture stock at a minimum price of £97 p.c.t. The yield at this price, allowing for redemption, is £5 5s. 5d. p.c.t., and the stock is to be redeemed at par on Dec. 31, 1950.

The report and accounts of the Oriental Gas Company, Ltd., for the year to June 30 last have been received, and show satisfactory results. The report states that, compared with the previous year, the revenue from gas and rentals has increased by £2938, and the receipts from residuals by £1610. The sale of gas increased about 1½ p.c.t., and 1111 more gas appliances were installed. The accounts show a net profit of £29,975, against £33,344.

Coal Markets.

The coal trade is unfortunately once again very much in the limelight, with the usual threats of impending crises over hours, wages, and conditions of labour. This is quite naturally adding yet another difficulty to the export markets. During the past month or two European competitors have been freely tendering for all the contracts, while British exporters have been severely handicapped by not knowing what quotas and minimum prices will be fixed under the new marketing schemes. These are still an unknown quantity, but incidentally it may be mentioned that Polish coal is at present offering at quite two shillings below the ruling minimum prices for equivalent Northumberland qualities, which are no doubt absolutely rock bottom in relation to production costs. Now comes the crisis of reduced statutory working hours on Dec. 1, with the refusal of the miners to contemplate the fortnightly spread-over or reduced rates of pay, so that marketing scheme or no scheme, the old situation arises where the foreigner goes elsewhere for his coal, and goes where he is certain of getting delivery when he wants it.

In the meantime, home industrial trade is very quiet, but gas coals for prompt delivery have been more active in the past week, especially the better qualities. In Durhams, Wear special qualities have been in quite good demand round 15s. 6d., with some makes asking up to 15s. 9d. Best qualities (Holmside, Boldon class) are steady at 14s. 9d. to 15s., but seconds and others are plentiful and freely offered at 12s. 6d. to 13s. 3d. Yorkshire screened gas for export is 16s. 6d. to 18s.

Gas coke is in rather better supply, but the demand remains satisfactory, and 21s. 6d. is held.

Current Sales of Gas Products.

The London Market for Tar, Tar Products, and Sulphate

LONDON, *Nov.* 17.

The prices of tar products are as follows:

Pitch, 47s. 6d. per ton f.o.b.

Creosote, for export, 6d. to 6¼d. per gallon f.o.b.

Pure toluole, about 2s. per gallon; pure benzole, about 1s. 8d. per gallon; 95/160 solvent naphtha, about 1s. 5d. per gallon; pyridine bases, about 3s. 9d. per gallon.

The prices for spirits are all naked at sellers' works.

Tar Products in the Provinces.

Nov. 17.

The average prices of gas-works products during the week were: Gas-works tar, 20s. to 24s. Pitch—East Coast, 46s. f.o.b. West Coast, Manchester, Liverpool, Clyde, 46s. f.o.b.* Toluole, naked, North, 1s. 6½d. to 1s. 7¼d. Coal-tar crude naphtha, in bulk, North, 9d. to 10d. Solvent naphtha, naked, North, 1s. 2½d. to 1s. 2¾d. Heavy naphtha, North, 11d. to 1s. Creosote, in bulk, North, liquid and salty, 3½d. to 3¾d.; low gravity, 1½d.; Scotland, 3½d. to 3¾d. Heavy oils in bulk, North, 5½d. to 6d. Carbolic acid, 60's, 1s. 4½d. to 1s. 6d. Naphthalene, £10 to £12. Salts, £3 to £5, bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.c.t., purely nominal; "B" quality, unsaleable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port, it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Nov.* 15.

Conditions are unchanged in this area. Distillers have been able to reduce their stocks somewhat, but prices realized are disappointing. The supply of motor benzole is more than the demand, and stocks are accumulating.

Pitch.—Export orders continue scarce, and value is nominal at 45s. per ton f.o.b. Glasgow. Home trade is about 42s. 6d. per ton f.o.r. works.

Refined tar to Ministry of Transport Specification remains easy at 2¾d. to 3⅛d. per gallon in buyers' barrels f.o.r.

Creosote.—Neutral oil is available in large quantities, but other grades are in fair request. B.E.S.A. Specification is 2¾d. to 3¼d. per gallon; low gravity, 3d. to 3½d. per gallon; and neutral oil, 3d. to 3¼d. per gallon—all *ex* makers' works in bulk.

Cresylic.—There is no improvement to record. Pale, 97/99 p.c.t., is 1s. 6½d. to 1s. 7½d. per gallon; dark, 97/99 p.c.t., 1s. 5½d. to 1s. 6½d. per gallon; and pale, 99/100 p.c.t., 1s. 8½d. to 1s. 9½d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha.—Production is low, and the value remains steady at 4d. to 4½d. per gallon *ex* works.

Solvent naphtha.—Few orders are being placed, but quotations are steady; 90/160 being 1s. 2½d. to 1s. 3d. per gallon, and 90/190, 1s. to 1s. 0½d. per gallon.

Motor benzole.—As stocks are increasing the value is lower at 1s. 4d. to 1s. 4½d. per gallon.

Pyridines continue without interest. 90/160 is nominal at 3s. to 3s. 3d. per gallon.

Benzole Prices.

The following are considered to be the market prices at the present time:

	s. d.		s. d.	
Crude benzole	0 7½	to	0 8½	per gallon at works
Motor "	1 3	"	1 4	" " "
Pure "	1 7½	"	1 8½	" " "

Trade Notes.

Large Leeds Fireclay Company Contract.

We understand that the Leeds Fireclay Company, Ltd., of Wortley, Leeds, have booked a contract for a supply of terra cotta for the interior of a very large building on the Continent, which would probably amount to £100,000.

Order for Becker Coke Ovens.

Against world-wide competition, the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., have received an order from the South African Iron and Steel Industrial Corporation, Ltd., for a large installation of Becker coke ovens complete with bye-product recovery plant to be built at their new works at Pretoria. The new coking plant will produce blast-furnace coke for use in blast furnaces, the ovens being fired by blast-furnace gas. The coke oven gas will be utilized in various parts of the works. The contract, which has been entrusted to the Woodall-Duckham Company, includes coal handling, storage, crushing, and mixing plant; Becker regenerative and combination type coke ovens; coke screening plant; and complete bye-products plant.

Contracts Advertised To-Day.

Tank.

The Lancaster Corporation invite tenders for the supply, among other plant, of a tar and liquor tank. [Advert. on p. 546.]

Purifiers, Oxide Handling Plant, &c.

The Lancaster Corporation invite tenders for the supply of purifiers, oxide handling plant, valves, &c. [Advert. on p. 546.]

STOCK AND SHARE LIST.

[For Stock Market Report, see earlier pages.]

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr.	Dividends. Last Hf. Yr.	NAME.	Quotations. Nov. 14.	Rise or Fall on Week.	Transact'ns Lowest and Highest Prices During the Week.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 14	5	5	Aldershot 5 p.c. max. C.	73—78	..	75
522,992	,,	,,	4	4	Do. 4 p.c. Pref.	72—75	..	73½
1,551,868	,,	Oct. 9	7½	7½	Alliance & Dublin Ord.	95—98	+1	97½
374,000	,,	July 10	4	4	Do. 4 p.c. Deb.	64—67	..	..
522,655	,,	Aug. 28	7	7	Barnet Ord. 7 p.c.	107—110	..	..
300,000	1	Oct. 23	1/4½	1/7½	Bombay, Ltd.	15/6 - 17/6	..	..
174,500	10	Aug. 14	9	9	Bournemouth 5 p.c.	14½—15½	+½	14⅝ 15
500,050	10	,,	7	7	Do. B 7 p.c.	12½—12⅝	..	12½—12⅝
439,160	10	,,	6	6	Do. Pref. 6 p.c.	11—11¼	..	11¼ -11⅜
50,000	Stk.	June 26	3	3	Do. 3 p.c. Deb.	58 - 61	..	..
162,025	,,	,,	4	4	Do. 4 p.c. Deb.	77—80	..	..
357,900	,,	Aug. 28	7½	7½	Brighton & Hove 6 p.c. Con.	113 - 117	..	114—115
871,880	,,	,,	6½	6½	Do. 5 p.c. Con.	101—104	..	102½—103½
1,287,500	,,	July 24	5	5	Bristol 5 p.c. max.	92½—93¼a	..	..
855,000	,,	Sept. 25	8	7	British Ord.	108 - 113	..	112½
100,000	,,	June 26	7	7	Do. 7 p.c. Pref.	112—117	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	75—78	..	..
450 000	,,	,,	5	5	Do. 5 p.c. Red. Deb.	97—100	..	..
100,000	,,	June 26	5	5	Cambridge 5 p.c. Deb.	97—100	..	..
100,000	10	May 22	6	10	Cape Town, Ltd	9—10	..	..
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref.	6¾—7¼*	..	..
150,000	Stk.	June 26	4½	4½	Do. 4½ p.c. Deb.	71—76	..	75
626,860	,,	July 24	6	6	Cardiff Con. Ord.	95—98	..	..
287,860	,,	June 26	7½	7½	Do. 7½ p.c. Red. Deb.	99—102	..	..
157,150	,,	Aug. 14	5½	5	Chester 5 p.c Ord.	86—91b	..	..
98,936	1	Oct. 9	†2/-	†2/-	Colombo, Ltd. Ord.	32/—34/-	..	..
24 500	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	18/—20/-	..	..
609,204	1	Oct. 9	1/9½	1/4½	Colonial Gas Assn. Ltd. Ord	16/6 -18/6	..	18/3
296,053	1	,,	1/7½	1/7½	Do. 8 p.c. Pref.	18/—20/-	..	..
2,073,280	Stk.	July 24	7	6	Commercial Ord.	94—97	..	95—96½
475,000	,,	June 26	3	3	Do. 3 p.c. Deb.	58—61	..	..
787,560	,,	Aug. 14	7	7	Croydon sliding scale	105—108	..	..
453,100	,,	,,	5	5	Do. max. div.	81—84	..	84
542,270	,,	Aug. 14	10	7	Derby Con.	115—125e	..	..
55,000	,,	June 26	4	4	Do. Deb.	65—70e	..	..
209.000	,,	Aug 28	5	5	East Hull Ord. 5 p.c.	69—71	..	..
1,002,180	,,	Sept. 25	†7g	†4	European, Ltd.	100—110	..	103—110
18,629,125	,,	July 24	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	19/6—20/-f	..	19/11 19/9
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	63—65	..	64⅜—64
4,157,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	79—84	+1	80 81
5,602,620	,,	June 26	3	3	Do. 3 p.c. Con. Deb.	60—63	..	62 62½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb.	101—104	+1	..
161,480	,,	Sept. 11	10	10	Harrogate Cons. 10 p.c. max.	155—160	..	..
82.500	,,	Aug. 28	7	7	Hastings & St. L. 5 p.c. Conv.	97—102	..	..
268.740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	76—81	..	78—79½
70,000	10	Oct. 9	‖	10	Hongkong & China, Ltd.	13—14	..	..
213,200	Stk.	Aug 14	6	6	Hornsey Con. 3½ p.c.	88—91	..	..
2,438,594	,,	Nov. 6	25	15	Imperial Continental Cap.	840—860*	−5	842½—857
223,180	,,	Aug. 14	3½	3½	Do. 3½ p.c. Red. Deb.	80—85	..	..
235,242	,,	Aug. 14	8½	8½	Lea Bridge 5 p.c. Ord.	123—128	..	..
2,145,907	,,	Aug. 14	6	6	Liverpool 5 p.c. Ord.	95½—96½b	..	..
600.000	,,	Sept. 25	7	7	Do. 7 p.c. Red. Pref.	97¼—99½b	..	..
165,736	,,	Aug. 28	8	9	Maidstone 5 p.c. Cap.	120—125	..	..
63,480	,,	June 26	3	3	Do. 3 p.c. Deb.	55—58	..	..
75,000	5	June 26	†10	†10	Malta & Mediterranean	5¼—6	..	5⅞
392,000	—	Oct. 1	5½	5½	Metrop'litan (of Melbourne) 5½ p.c. Red. Deb.	88—91	..	..
675,000	Stk.	May 22	†6	†8	Montevideo, Ltd.	100—110	..	..
2,061,315	,,	July 24	5⅜	5	Newcastle & Gateshead Con.	16/3—16/9d/	+·/1¼	..
682,856	,,	,,	4	4	Do. 4 p.c. Pref.	71½—72½d	..	..
691,705	,,	June 26	3½	3½	Do. 3½ p.c. Deb.	67½—68½d	..	..
169,940	,,	Aug. 28	7½	7½	North Middlesex 6 p.c. Con.	115—120	+9	..
396,160	,,	Aug. 14	5	5	Northampton 5 p.c. max.	76—81	..	..
300.000	,,	Apl. 24	9	7	Oriental, Ltd.	108—113	..	..
60,000	5	18 My., '15	—	—	Ottoman	0—¼	..	..
205,162	Stk.	June 26	8	8	Plym'th & Stonehouse 5 p.c.	110 - 115	..	..
424,416	,,	Aug. 28	8	8	Portsm'th Con. Stk. 4 p.c. Std	107—112	..	..
241,446	,,	,,	5	5	Do. 5 p.c. max.	77—80	..	..
186,000	100	June 2	4	4	Primitiva 4 p.c. Red. Deb.	96—99	..	..
677,887	Stk.	July 24	4	4	Do. 4 p.c. Red. Deb. 1911	83—86	..	85
371,496	,,	June 26	4	4	Do. 4 p.c. Cons. Deb.	83—86	..	..
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref.	8½—8⅝	..	..
1,736,968	Stk.	Aug. 28	6½	6½	Sheffield Cons.	104—106e	..	..
95.000	,,	July 10	4	4	Do. 4 p.c. Deb.	76—78e	..	..
90.000	10	June 5	‖4	‖5	South African	4—6	..	..
6,709,895	Stk.	Aug. 14	7½	5	South Met. Ord.	103—105	..	104—105
500,000	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	111—114	+1	113—113⅜
1,895,445	,,	July 10	3	3	Do. 3 p.c. Deb.	60—63	..	..
784,000	,,	Sept 11	6½	6½	Do. 6½ p.c. Red. Db.	99—102	..	101—101⅛
91,500	,,	Aug. 14	8½	8½	South Shields Con.	105—107d	..	..
1,543,795	,,	July 24	6½	6½	South Suburban Ord. 5 p.c.	102—105	..	..
468,837	,,	June 26	5	5	Do. 5 p.c. Deb.	97—100	..	97 99
647,740	,,	Aug. 28	5	5	Southampton Ord. 5 p.c. max.	75—78	..	..
121.275	,,	June 26	4	4	Do. 4 p.c. Deb.	76—78	..	..
179,014	,,	July 24	8	8	Sutton Ord.	115—120	..	..
94,500	,,	June 26	5	5	Do. 5 p.c. Deb.	96—99	..	..
250,000	,,	Aug. 28	7	7	Swansea 7 p.c. Red. Pref.	98—101	..	..
200,000	,,	June 26	6½	6½	Do. 6½ p.c. Red. Deb.	102—105	..	..
1,076,490	,,	July 24	6⅝	6⅝	Tottenham District Ord.	101 - 106	..	104½
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	95—98	..	..
199,005	,,	June 26	4	4	Do. 4 p.c. Deb.	77—80	..	..
182,880	10	30 Dec., '12	—	—	Tuscan, Ltd.	2—3	..	..
85,701	Stk.	Sept. 25	6	6	Do. 6 p.c. Red. Deb.	73—78	..	..
309,094	,,	Aug. 28	7	7	Uxbridge, Maidenhead, & Wycombe 5 p.c.	95—100	..	..
88,830	,,	,,	5	5	Do. 5 p.c. pref.	88—93	..	..
1,180,970	,,	July 10	—	7	Wandsworth, Wimbledon, and Epsom Cons.	108—113	..	110—111½
200,000	,,	,,	5	5	Do. 5 p.c. Pref.	91—94	..	..
488,344	,,	June 26	5	5	Do. 5 p.c. Deb.	99—102	..	100 - 101½

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. .—The quotation is per £1 of Stock. g.—Paid on £10 shares. * Ex. div. † Paid free of income-tax. ‖ For year. § Div = 10 p.c. p.a. less tax and less tax on interim dividend.

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Indirect Water Heater

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Adoption means Progress

THE SECRET OF A CHEAP & ABUNDANT SUPPLY of HOT WATER

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MINIMUM GAS CONSUMPTION
NEGLIGIBLE MAINTENANCE COSTS
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NO DEPOSITS IN FLUES OR BOILER
WORKS INDEPENDENTLY OR IN CONJUNCTION WITH THE RANGE BOILER

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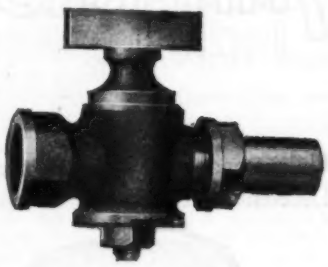
(BRANCH OF METERS LTD.)



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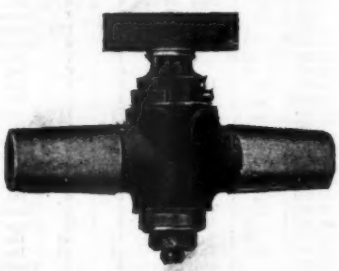
FOR

MAIN TAPS



No. 64

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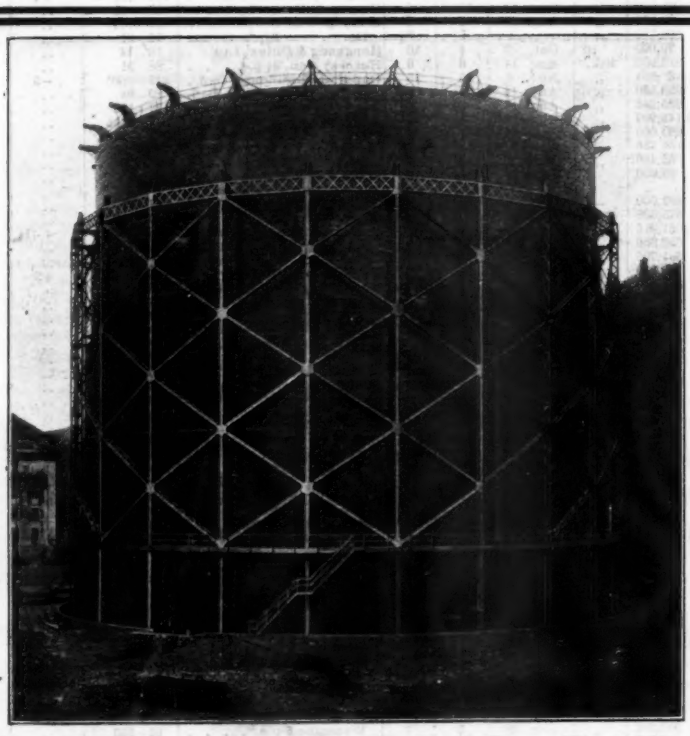

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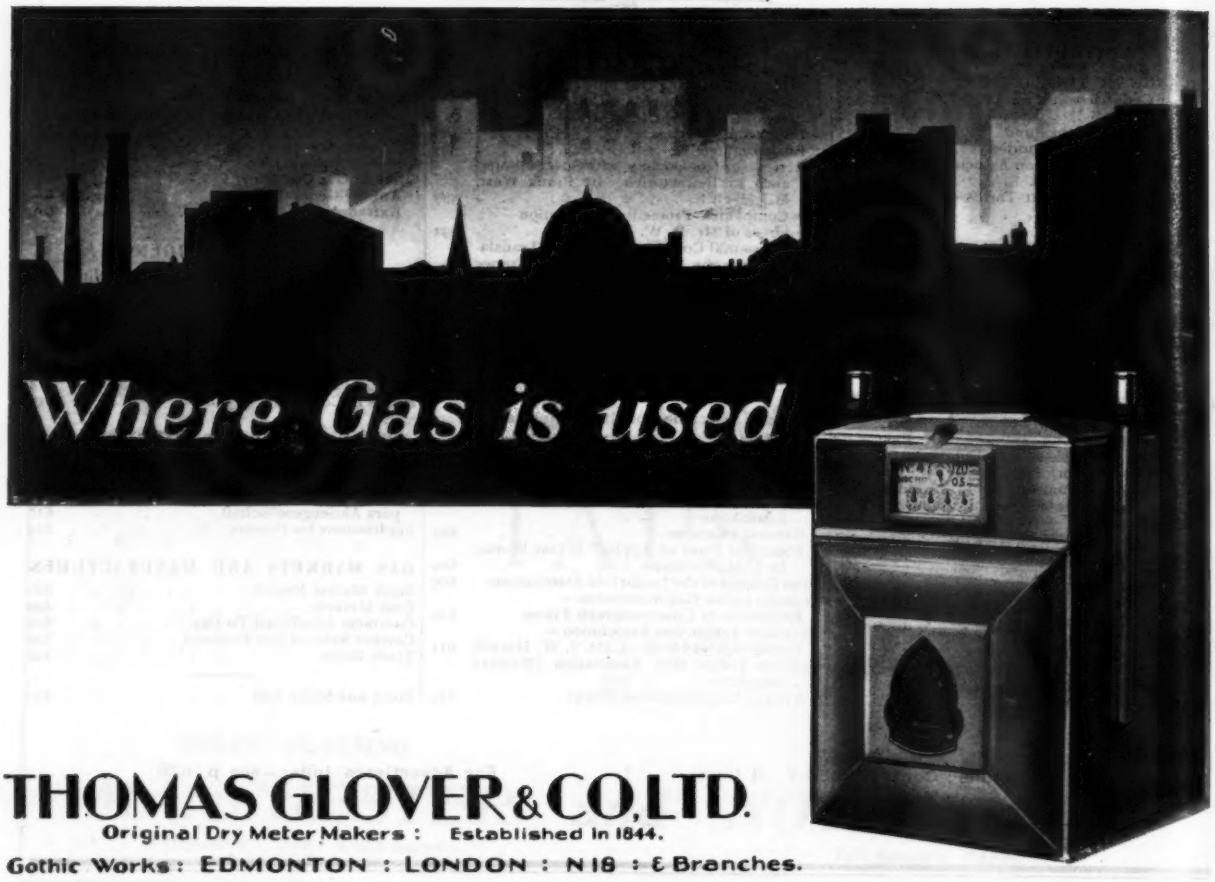

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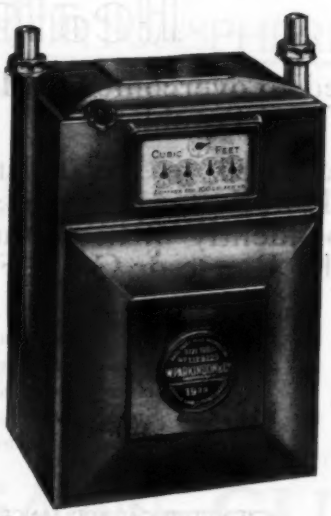

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